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Primary Production in the Northern Sargasso Sea in September 1988

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Canadian Data Report of Fisheries & Aquatic Sciences No. 798

Fisheries and Oceans Pêches et Océans

Canada

Canadian Data Report of Fisheries and Aquatic Sciences

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ABSTRACT

B. Irwin, J. Anning, C. Caverhill, M. Hodgson, A. Macdonald and T. Platt. 1990. Primary production in the Northern Sargasso Sea in September 1988. Can. Data Rep. Fish. Aquat. Sci. No. 798: iv + 93 p.

During the period September 7 to September 21 1988, primary productivity and other related variables were measured in the Northern Sargasso Sea. In this report we make available the raw data and some fitted parameters.

RESUME

B. Irwin, J. Anning, C. Caverhill, M. Hodgson, A. Macdonald and T. Platt. 1990. Primary production in the Northern Sargasso Sea in September 1988. Can. Data Rep. Fish. Aquat. Sci. No. 798: iv + 93 p.

Pendant la période du 7 septembre au 21 septembre 1988, la production primaire et plusiers autres variables ont été mesurée dans la mer du Sargasse. Dans ce rapport nous présentons les données brutes ainsi que les paramètres calculées.

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INTRODUCTION

This cruise was undertaken to collect data to test the existence and magnitude of the hypothetical active Dissolved Inorganic Nitrogen (DIN) flux by diel migrant biota. It had been postulated by Longhurst and Harrison (1988) that excretion of DIN by diel migrant zooplankton below the photic zone by day is a significant downward flux relative to the vertical export of particulate organic nitrogen (PON) as captured by sediment traps. To this end a single station in the Northern Sargasso Sea was occupied for 10 days during which daily estimates of *in situ* primary production were obtained and estimates of sedimentation rates were calculated from a free-drifting sediment trap array deployed at the beginning of the experiment and recovered at the end of the experiment.

METHODS

In situ Productivity Profiles

Water samples were collected from 11 depths with 12 *l* Niskin bottles at 0500 hrs. local time each day. Sampling depths were 1, 10, 20, 30, 40, 50, 60, 70, 80, 90 and 100 m. The ^{14}C method of Strickland and Parsons (1972) was used to measure primary productivity. 40 µci of sodium bicarbonate ^{14}C was added to each of 6 light and 3 dark bottles from each depth. Light bottles were deployed at sampled depths before sunrise and recovered at sunset. Dark bottles were kept in a darkened cooler at *in situ* temperatures. All samples were filtered onto Whatman GF/F filters immediately after recovery.

PI Experiments

Water samples were collected with 30 *l* Niskin bottles or from a modified continuous pump sampler (Herman et al. 1984). 40 µci of sodium bicarbonate ^{14}C was added to each of 42 light and 2 dark bottles for each experiment. Bottles were incubated in temperature controlled incubators illuminated by 250 w tungsten halogen lamps. All incubations were of three hours duration. All samples were filtered onto Whatman GF/F filters.

Sediment Traps

The sediment trap array consisted of 4 collectors at 150, 250, 500 and 1000 m. They were deployed at 1600 hrs. on September 10 at 36° 01'N 64° 06'W and recovered at 1000 hrs. on September 19 at 36° 12'N 65°51'W. Samples for chlorophyll and particulate organic carbon were collected from the sediment.

Chlorophyll

Replicate 100 mls of sample were filtered onto 25 mm Whatman GF/F filters. Chlorophyll was extracted for 24 hours with 85% acetone at 0°C in the dark. The fluorometric technique of Yentsch and Menzel (1963) as modified by Holm-Hansen et al. (1965) was used to estimate chlorophyll concentrations.

Organic Particulates

Samples for particulate organic carbon and organic nitrogen were filtered onto precombusted 25 mm Whatman GF/F filters. Filters were analysed by combustion in a Perkin Elmer Model 10 CHN analyser.

Nutrients

Samples for nitrate, silicate and inorganic phosphate were collected from most sampled depths. Samples were analysed immediately after collection using a Technicon II Autoanalyser. Nitrate was measured using industrial method 158-71W, silicate with method 186-72W and phosphate with method 155-71W.

Incubation Light

Photosynthetically Active Radiation (P.A.R.) was measured at each bottle position in the incubators with a Biospherical Instruments 4π quantum meter (Model Q.S.L. 100).

Estimation of Photosynthetic Parameters

Measurement of specific production P^B and irradiance I were used to estimate parameters in the equation of Platt et al. (1980),

$$P^B = P_S(1-e^{-\alpha I/P_s})\, e^{-\beta I/P_s}$$

P_s(mg C mg Chl^{-1} h^{-1}) is the light saturated rate of photosynthesis in the absence of photoinhibition, α (mg C (mg Chl)$^{-1}$ h^{-1} w^{-1} m^{-2}) is the initial slope of the PI curve and β (same units as α) is a parameter that characterises photoinhibition. Complete details of the fitting routine are given in Irwin et al. (1982) and a discussion of the mathematical basis for this technique is given in Irwin et al. (1980).

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LOCATION OF SAMPLING STATIONS

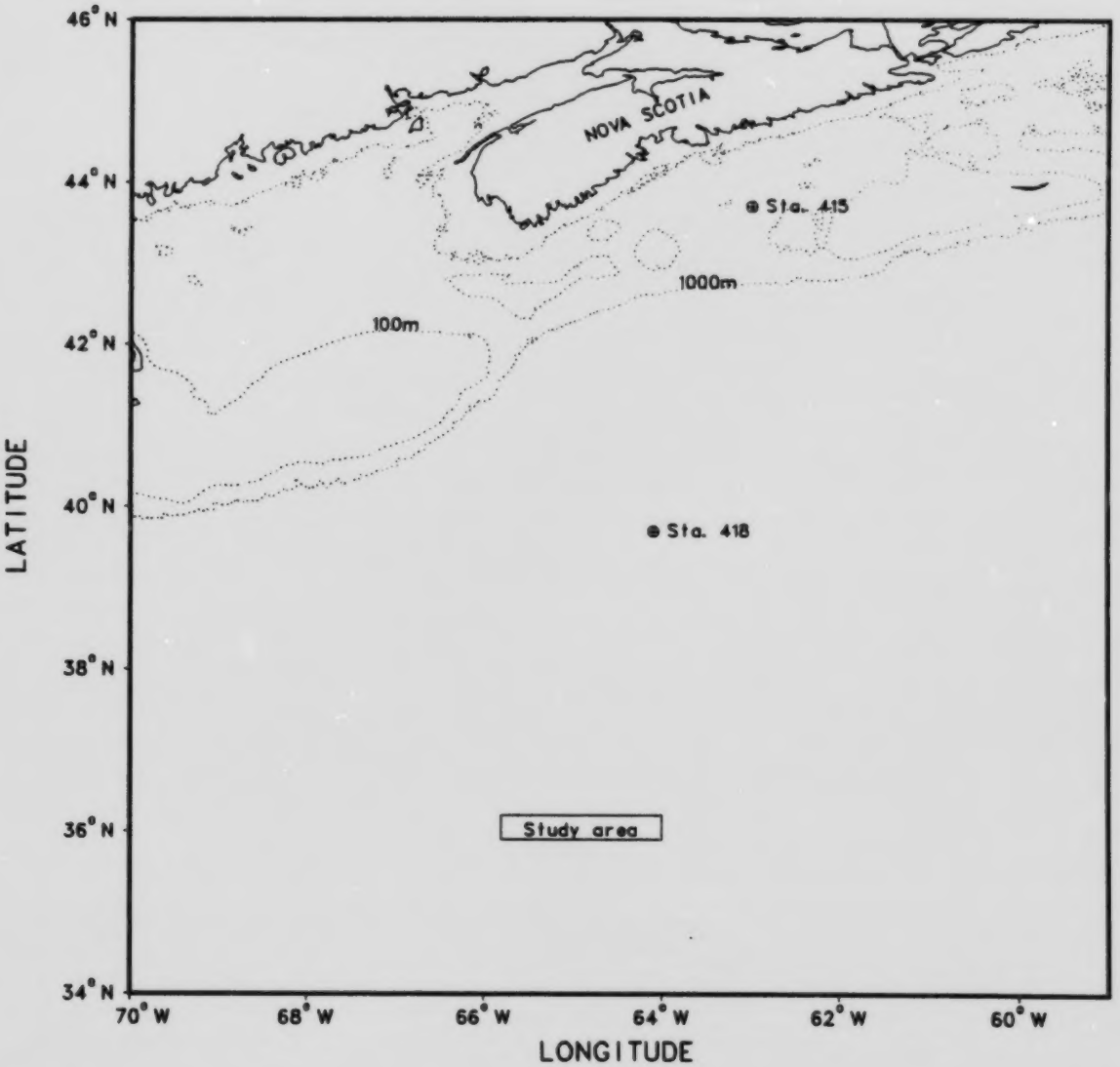


Fig. 1 Location of sampling stations

Sediment Trap

Date Deployed	September 10, 1988
Time Deployed	16.00 hrs. ADT
Position	36°00 8'N 64°06 1'W
Date Recovered	September 19, 1988
Time Recovered	10.00 hrs. ADT
Position	36°11 65'N 65°50 89'W
Duration	210 hrs.

Upon recovery it was noted that the traps at 500 and 1000 m were contaminated with organisms which had become attached to the rope supporting the trap arrays. The data from these depths were therefore rejected.

Depth	POC			PON		
m	Mg C	Mg C m^{-2}	mg C m^{-2} d^{-1}	Mg N	Mg N m^{-2}	mg N m^{-2} d^{-1}
150	8.50	621	71	1.13	83	9.4
250	5.56	406	46	0.62	45	5.2

IN SITU PROFILES

UNITS

Z = depth in meters

P = primary production mg C m^{-3} h^{-1}

NO_3 = nitrate concentration mg at m^{-3}

SiO_3 = silicate concentration mg at m^{-3}

PO_4 = phosphate concentration mg at m^{-3}

Chl = chlorophyll concentration mg m^{-3}

Phae = phaeophytin concentration mg m^{-3}

POC = particulate organic carbon mg m^{-3}

PON = particulate organic nitrogen mg m^{-3}

SARGASSO SEA 1988

STATION NO. 415

LAT 43°44.00' N LONG 63° 1.00' W DATE 08/09/88

Z	CHL	PHAE	NO3	SIO3	PO4	POC	PON	P
5	.69	.37	.89	.41	.01	178	30	-
15	1.88	.91	2.08	.54	.58	166	26	-
25	1.13	.64	3.04	.78	2.88	106	18	-

SARGASSO SEA 1988

STATION NO. 418

LAT 39°43.90' N LONG 64° 5.80' W DATE 09/09/89

Z	CHL	PHAE	NO3	SIO3	PO4	POC	PON	P
10	.45	.15	.48	.15	.15	78	8	-
35	.82	.35	1.10	.21	.12	92	14	-
45	.88	.61	1.59	.19	1.30	90	12	-

SARGASSO SEA 1988

STATION NO. 420

LAT 36° .40' N LONG 64° .00' W DATE 10/09/88

Z	CHL	PHAE	NO3	SIO3	PO4	POC	PON	P
1	.12	.00	.56	.23	.00	53	6	.211
10	.11	.01	.60	.22	.00	49	8	.259
20	.11	.01	.44	.20	.00	65	6	.044
30	.12	.00	.57	.21	.00	-	8	.008
40	.16	.01	.57	.23	.00	82	8	.071
50	.30	.03	.49	.23	.00	63	8	.064
60	.40	.08	.34	.22	.00	64	10	.274
70	.51	.13	.27	.22	.00	62	7	.035
80	.60	.39	.22	.20	.00	60	7	.153
90	.59	.44	.20	.20	.31	44	5	.110
100	.47	.46	.23	.22	.76	44	5	.051
150	.07	.05	.54	.28	2.55	48	4	-
200	.03	.05	.49	.31	2.34	94	7	-

SARGASSO SEA 1988

STATION NO. 426

LAT 36° .30' N LONG 64° 2.80' W DATE 10/09/88

Z	CHL	PHAE	NO3	SIO3	PO4	POC	PON	P
1	.14	.00	.63	.09	.00	86	12	-
10	.14	.01	.71	.08	.00	74	9	-
20	.14	.00	.43	.05	.00	49	8	-

SARGASSO SEA 1988

STATION NO. 436

LAT 35°59.40' N LONG 64°12.70' W DATE 11/09/88

Z	CHL	PHAE	NO3	SIO3	PO4	POC	PON	P
1	.13	.01	.67	.04	.05	53	4	.334
10	.13	.00	.65	.08	.04	48	5	.340
20	.13	.00	.58	.04	.04	63	5	.133
30	.13	.01	.65	.05	.03	80	7	.096
40	.14	.01	.69	.12	.05	52	6	.113
50	.21	.04	.52	.10	.04	54	4	.140
60	.35	.06	.47	.13	.03	71	12	.259
70	.48	.11	.53	.09	.00	67	9	.067
80	.55	.24	.22	.07	.00	49	7	.202
90	.60	.42	.14	.07	.02	47	6	.134
100	.61	.43	.21	.11	.35	48	4	.092
150	.12	.14	.60	.17	2.65	56	5	-
200	.04	.04	.45	.18	2.20	60	6	-

SARGASSO SEA 1988

STATION NO. 440

LAT 35°59.50' N LONG 64° 6.80' W DATE 11/09/88

Z	CHL	PHAE	NO3	SIO3	PO4	POC	PON	P
1	.15	.01	-	-	-	-	-	-
5	.15	.01	-	-	-	-	-	-
10	.16	.01	-	-	-	-	-	-
15	.16	.01	-	-	-	-	-	-
20	.15	.00	-	-	-	-	-	-
25	.15	.01	-	-	-	-	-	-
30	.16	.01	.67	.08	.04	68	8	-
35	.18	.10	-	-	-	-	-	-
40	.18	.01	.65	.06	.00	46	6	-
45	.21	.02	-	-	-	-	-	-
50	.26	.05	.70	.06	.00	61	8	-
55	.38	.06	-	-	-	-	-	-
60	.42	.06	-	-	-	-	-	-
65	.46	.10	-	-	-	-	-	-
70	.50	.10	-	-	-	-	-	-
75	.56	.16	-	-	-	-	-	-
80	.60	.28	-	-	-	-	-	-
85	.60	.24	-	-	-	-	-	-
90	.63	.38	-	-	-	-	-	-
95	.64	.44	-	-	-	-	-	-
100	.53	.44	-	-	-	-	-	-
105	.41	.35	-	-	-	-	-	-
110	.43	.35	-	-	-	-	-	-

SARGASSO SEA 1988

STATION NO. 454

LAT 35°54.80' N LONG 64°24.70' W DATE 12/09/88

Z	CHL	PHAE	NO3	SIO3	PO4	POC	PON	P
1	.11	.00	.71	.05	.00	43	6	.320
10	.11	.00	.72	.06	.00	46	5	.342
20	.11	.01	.42	.05	.01	64	5	.128
30	.10	.00	.66	.06	.00	57	7	.096
40	.11	.00	.69	.06	.00	55	5	.120
50	.14	.01	.72	.07	.00	48	7	.097
60	.27	.02	.32	.05	.00	60	8	.311
70	.40	.10	.37	.10	.10	57	5	.116
80	.51	.31	.23	.07	.00	46	7	.222
90	.60	.52	.23	.06	.34	41	6	.162
100	.42	.42	.17	.08	.85	38	7	.091
150	.07	.05	.47	.15	2.44	46	6	-
200	.02	.04	.38	.17	2.35	32	2	-

SARGASSO SEA 1988

STATION NO. 457

LAT 35°56.40' N LONG 64°27.50' W DATE 12/09/88

Z	CHL	PHAE	NO3	SIO3	PO4	POC	PON	P
1	.13	.02	-	-	-	-	-	-
5	.15	.01	-	-	-	-	-	-
10	.14	.00	-	-	-	-	-	-
15	.14	.00	-	-	-	-	-	-
20	.14	.00	-	-	-	-	-	-
25	.14	.00	-	-	-	-	-	-
30	.14	.00	-	-	-	-	-	-
35	.14	.00	-	-	-	-	-	-
40	.14	.00	-	-	-	-	-	-
45	.14	.01	-	-	-	-	-	-
50	.30	.04	-	-	-	-	-	-
55	.33	.05	-	-	-	-	-	-
60	.38	.04	.11	.07	.00	49	7	-
65	.44	.05	-	-	-	-	-	-
70	.49	.09	.15	.07	.00	54	9	-
75	.52	.15	-	-	-	-	-	-
80	.51	.24	.19	.09	.00	67	7	-
85	.64	.50	-	-	-	-	-	-
90	.55	.64	-	-	-	-	-	-
95	.51	.52	-	-	-	-	-	-
100	.37	.47	-	-	-	-	-	-
105	.33	.34	-	-	-	-	-	-
110	.28	.36	-	-	-	-	-	-

SARGASSO SEA 1988

STATION NO. 469

LAT 35°56.30' N LONG 64°37.20' W DATE 13/09/88

Z	CHL	PHAE	NO3	SIO3	PO4	POC	PON	P
1	.12	.01	.56	.07	.00	42	5	.313
10	.12	.01	.57	.06	.00	38	3	.357
20	.12	.00	.48	.07	.00	49	4	.155
30	.13	.00	.62	.06	.00	58	5	.110
40	.13	.01	.50	.08	.01	50	5	.152
50	.18	.03	.56	.06	.00	45	4	.129
60	.33	.04	.26	.07	.00	51	5	.260
70	.47	.10	.16	.07	.00	48	4	.117
80	.56	.34	.05	.05	.00	49	6	.245
90	.61	.39	.02	.08	.37	40	3	.125
100	.38	.41	.22	.08	1.24	45	4	.076
150	.07	.05	.31	.12	1.93	34	3	-
200	.03	.04	.41	.17	2.47	27	1	-

SARGASSO SEA 1988

STATION NO. 487

LAT 35°54.60' N LONG 64°48.20' W DATE 14/09/88

Z	CHL	PHAE	NO3	SIO3	PO4	POC	PON	P
1	.13	.01	.57	.02	.00	63	7	.332
10	.13	.00	.57	.00	.00	46	5	.349
20	.13	.01	.54	.02	.00	47	4	.190
30	.13	.00	.65	.04	.00	63	6	.200
40	.13	.01	.76	.02	.00	46	5	.227
50	.15	.00	.72	.02	.00	52	6	.355
60	.30	.04	.47	.03	.00	55	7	.304
70	.38	.08	.35	.07	.00	54	6	.148
80	.52	.22	.19	.01	.00	55	6	.270
90	.62	.43	.18	.02	.03	44	2	.176
100	.39	.43	.19	.05	.83	43	5	.083
150	.06	.05	.35	.08	2.05	38	2	-
200	.02	.04	.39	.10	2.33	40	3	-

SARGASSO SEA 1988

STATION NO. 490

LAT 35°54.80' N LONG 64°49.90' W DATE 14/09/88

Z	CHL	PHAE	NO3	SIO3	PO4	POC	PON	P
1	.15	.00	-	-	-	-	-	-
5	.15	.01	-	-	-	-	-	-
10	.14	.01	-	-	-	-	-	-
15	.15	.00	-	-	-	-	-	-
20	.15	.01	-	-	-	-	-	-
25	.16	.01	-	-	-	-	-	-
30	.14	.02	-	-	-	-	-	-
35	.14	.01	-	-	-	-	-	-
40	.14	.01	-	-	-	-	-	-
45	.15	.02	-	-	-	-	-	-
50	.16	.02	-	-	-	-	-	-
55	.28	.04	-	-	-	-	-	-
60	.36	.10	-	-	-	-	-	-
65	.41	.12	-	-	-	-	-	-
70	.49	.16	-	-	-	-	-	-
75	.58	.15	-	-	-	-	-	-
80	.67	.42	-	-	-	-	-	-
85	.67	.48	-	-	-	-	-	-
90	.57	.48	.01	.06	.24	46	5	-
95	.49	.51	-	-	-	-	-	-
100	.49	.45	.08	.06	.66	34	4	-
105	.33	.40	-	-	-	-	-	-
110	.27	.38	.01	.06	.94	92	5	-

SARGASSO SEA 1988

STATION NO. 507

LAT 35°54.50' N LONG 64°58.50' W DATE 15/09/88

Z	CHL	PHAE	NO3	SIO3	PO4	POC	PON	P
1	.16	.05	.71	.07	.00	67	10	.383
10	.15	.05	.72	.04	.00	46	6	.397
20	.15	.04	.74	.07	.00	60	5	.212
30	.16	.05	.32	.04	.00	58	6	.228
40	.15	.05	.63	.04	.00	49	3	.209
50	.16	.05	.63	.04	.00	47	4	.138
60	.33	.04	.35	.10	.00	65	8	.213
70	.47	.10	.22	.10	.01	70	8	.152
80	.64	.23	.20	.15	.00	63	8	.155
90	.73	.43	.14	.04	.00	54	7	.100
100	.57	.49	.17	.06	.44	43	6	.057
150	.10	.13	.50	.12	2.38	43	5	-
200	.02	.03	.46	.12	2.19	27	3	-

SARGASSO SEA 1988

STATION NO. 531

LAT 35°59.30' N LONG 65°14.90' W DATE 16/09/88

Z	CHL	PHAE	NO3	SIO3	PO4	POC	PON	P
1	.19	.01	.61	.08	.00	58	7	.442
10	.19	.01	.62	.06	.00	54	7	.524
20	.17	.02	.61	.10	.00	47	6	.479
30	.19	.01	.66	.08	.00	54	6	.261
40	.19	.01	.70	.09	.00	51	8	.311
50	.18	.02	.62	.09	.00	68	8	.214
60	.40	.05	.43	.09	.00	63	7	.322
70	.51	.09	.18	.10	.00	61	8	.218
80	.61	.16	.05	.08	.00	48	7	.197
90	.72	.45	.14	.09	.11	46	4	.115
100	.54	.39	.26	.10	1.08	43	5	.070
150	.11	.09	.40	.14	2.25	32	2	-
200	.02	.05	.57	.16	2.42	37	1	-

SARGASSO SEA 1988

STATION NO. 534

LAT 35°55.70' N LONG 65°16.30' W DATE 16/09/88

Z	CHL	PHAE	NO3	SIO3	PO4	POC	PON	P
1	.18	.06	.56	.06	.00	52	7	-
5	.19	.03	-	-	-	-	-	-
10	.18	.03	.58	.06	.00	43	5	-
15	.20	.01	-	-	-	-	-	-
20	.21	.02	.68	.05	.00	65	8	-
25	.21	.01	-	-	-	-	-	-
30	.22	.01	-	-	-	-	-	-
35	.20	.02	-	-	-	-	-	-
40	.20	.01	-	-	-	-	-	-
45	.21	.02	-	-	-	-	-	-
50	.23	.02	-	-	-	-	-	-
55	.31	.02	-	-	-	-	-	-
60	.41	.05	-	-	-	-	-	-
65	.44	.07	-	-	-	-	-	-
70	.47	.11	-	-	-	-	-	-
75	.48	.11	-	-	-	-	-	-
80	.61	.25	-	-	-	-	-	-
85	.66	.50	-	-	-	-	-	-
90	.55	.44	-	-	-	-	-	-
95	.47	.51	-	-	-	-	-	-
100	.39	.42	-	-	-	-	-	-
105	.33	.39	-	-	-	-	-	-
110	.30	.29	-	-	-	-	-	-

SARGASSO SEA 1988

STATION NO. 542

LAT 35°58.60' N LONG 65°25.60' W DATE 17/09/88

Z	CHL	PHAE	NO3	SIO3	PO4	POC	PON	P
1	.18	.02	.58	.07	.00	56	5	.430
10	.18	.02	.53	.06	.00	38	3	.441
20	.18	.02	.54	.05	.00	52	5	.203
30	.18	.01	.49	.04	.00	43	5	.259
40	.18	.02	.53	.03	.00	42	3	.258
50	.18	.01	.52	.05	.00	39	3	.199
60	.33	.06	.33	.05	.00	56	4	.259
70	.51	.13	.31	.14	.00	45	5	.185
80	.57	.24	.12	.06	.00	42	4	.169
90	.71	.44	.08	.05	.00	36	3	.120
100	.59	.57	.16	.06	.56	35	4	.073
150	.06	.05	.47	.12	2.29	34	2	-
200	.02	.03	.46	.15	2.44	26	3	-

SARGASSO SEA 1988

STATION NO. 566

LAT 36° 4.10' N LONG 65°35.60' W DATE 18/09/88

Z	CHL	PHAE	NO3	SIO3	PO4	POC	PON	P
1	.18	.02	.45	.06	.00	44	4	.389
10	.18	.01	.49	.04	.00	39	3	.489
20	.17	.01	.55	.03	.00	47	3	.245
30	.17	.01	.53	.04	.00	48	6	.277
40	.16	.01	.52	.04	.00	36	3	.261
50	.16	.01	.52	.04	.00	45	5	.172
60	.16	.02	.54	.05	.00	47	3	.157
70	.39	.10	.46	.12	.03	57	5	.128
80	.49	.18	.24	.05	.00	40	5	.168
90	.62	.41	.22	.04	.00	35	3	.126
100	.58	.47	.29	.06	.48	35	6	.068
150	.07	.05	.60	.14	2.42	40	3	-
200	.02	.03	.57	.13	2.30	28	2	-

SARGASSO SEA 1988

STATION NO. 569

LAT 36° 5.60' N LONG 65°41.70' W DATE 18/09/88

Z	CHL	PHAE	NO3	SIO3	PO4	POC	PON	P
1	.18	.03	-	-	-	-	-	-
5	.18	.01	-	-	-	-	-	-
10	.18	.02	-	-	-	-	-	-
15	.18	.02	-	-	-	-	-	-
20	.17	.02	-	-	-	-	-	-
25	.16	.02	-	-	-	-	-	-
30	.19	.02	.64	.08	.01	57	5	-
35	.17	.02	-	-	-	-	-	-
40	.18	.02	1.19	.06	.01	35	2	-
45	.19	.02	-	-	-	-	-	-
50	.40	.08	.37	.06	.03	43	3	-
55	.36	.11	-	-	-	-	-	-
60	.43	.09	-	-	-	-	-	-
65	.54	.16	-	-	-	-	-	-
70	.59	.24	-	-	-	-	-	-
75	.67	.42	-	-	-	-	-	-
80	.57	.39	-	-	-	-	-	-
85	.59	.43	-	-	-	-	-	-
90	.32	.32	-	-	-	-	-	-
95	.28	.35	-	-	-	-	-	-
100	.26	.28	-	-	-	-	-	-
105	.20	.26	-	-	-	-	-	-
110	.19	.20	-	-	-	-	-	-

SARGASSO SEA 1988

STATION NO. 585

LAT 36°10.50' N

LONG 65°50.10' W

DATE 19/09/88

Z	CHL	PHAE	NO3	SIO3	PO4	POC	PON	P
1	.17	.00	.68	.05	.05	–	–	–
10	.17	.00	.64	.05	.06	–	–	–
20	.16	.01	.71	.03	.09	–	–	–
30	.16	.01	1.50	.03	.08	–	–	–
40	.17	.02	.02	.06	.07	–	–	–
50	.22	.04	1.14	.03	.06	–	–	–
60	.36	.09	.12	.03	.05	59	5	–
70	.54	.28	.14	.05	.04	48	4	–
80	.63	.43	.68	.04	.04	40	5	–
90	.59	.57	.55	.07	.81	–	–	–
100	.35	.29	.27	.10	1.59	–	–	–
110	.21	.22	.39	.12	1.91	–	–	–

LIGHT SATURATION DATA AND RELATED BIOMASS AND NUTRIENT DATA

UNITS

P = mg C (mg Chl-1) m^{-3} h^{-1}

I = W m^{-2}

P_S = mg C (mg Chl)$^{-1}$ h^{-1}

α = mg C (mg Chl)$^{-1}$ h^{-1} w^{-1} m^{-2}

β = mg C (mg Chl)$^{-1}$ w^{-1} m^{-2}

Organic particulates are in mg m^{-3}. Inorganic nutrients are in mg at m^{-3}. The 90% confidence interval for P_S, α, β are shown in the closed brackets below the estimates for each parameter.

SARGASSO SEA 1988

STATION NO. 415

LAT 43°44.0' N LONG 63° 1.0' W DATE 08/09/88 DEPTH 5 M

I	P	I	P	I	P	I	P
299	4.01	183	4.09	155	4.07	136	3.99
128	3.68	116	3.94	114	3.87	88	3.93
78	3.43	74	3.32	66	2.94	60	2.74
22	1.85	17	1.53	17	1.59	16	1.01
15	1.25	14	1.14	14	1.05	14	.91
13	.91	13	.76	13	.87	7	.64
6	.61	5	.44	5	.37	4	.24
2	.12	2	.07	2	.06	2	.05
2	.05	1	.02				

PARAMETER VALUES

PS : 4.43 ALPHA : .089 BETA : .0014

(4.10, 4.77) (.085, .092) (-.0002, .0031)

SAMPLE TEMP 14.6°C INCUBATION TEMP 14.6°C

CHLOROPHYLL : .69 CARBON : 178 NITROGEN : 30

NITRATE : .89 SILICATE : .41 PHOSPHATE : .01

SARGASSO SEA 1988

STATION NO. 415

LAT 43°44.0' N LONG 63° 1.0' W DATE 08/09/88 DEPTH 15 M

I	P	I	P	I	P	I	P
247	.62	211	.73	187	.93	159	1.02
151	1.01	108	1.02	82	.98	72	.94
58	.95	48	.92	44	.86	25	.79
18	.77	18	.58	16	.55	14	.48
14	.57	13	.36	11	.47	10	.37
9	.32	8	.24	7	.20	5	.25
4	.22	4	.16	4	.12	4	.10
3	.06	2	.07	1	.01	1	.02
1	.01	1	.01				

PARAMETER VALUES

PS : 1.32
(1.19, 1.44)

ALPHA : .046
(.043, .048)

BETA : .0031
(.0021, .0041)

SAMPLE TEMP 4.9°C INCUBATION TEMP 4.9°C

CHLOROPHYLL : 1.88 CARBON : 166 NITROGEN : 26

NITRATE : 2.08 SILICATE : .54 PHOSPHATE : .58

SARGASSO SEA 1988

STATION NO. 415

LAT 43°44.0' N LONG 63° 1.0' W DATE 08/09/88 DEPTH 25 M

I	P	I	P	I	P	I	P
458	.06	351	.11	303	.25	267	.35
247	.42	215	.50	116	.57	72	.64
60	.60	50	.62	48	.56	40	.59
30	.63	24	.59	21	.57	19	.54
16	.47	15	.39	8	.38	6	.32
5	.22	5	.19	4	.16	3	.12
2	.09	2	.10	1	.09	1	.08
1	.09	1	.06	1	.06	1	.06
1	.07	1	.04	1	.06	1	.04
.9	.03	.8	.03				

PARAMETER VALUES

PS : .78 (.74, .82)

ALPHA : .053 (.049, .056)

BETA : .0027 (.0023, .0030)

SAMPLE TEMP 3.1°C INCUBATION TEMP 3.1°C

CHLOROPHYLL : 1.13 CARBON : 106 NITROGEN : 18

NITRATE : 3.04 SILICATE : .78 PHOSPHATE : 2.88

SARGASSO SEA 1988

STATION NO. 418

LAT 39°43.9' N LONG 64° 5.8' W DATE 09/09/88 DEPTH 10 M

I	P	I	P	I	P	I	P
299	3.13	183	3.09	155	3.08	136	2.90
128	3.01	116	3.07	114	3.15	88	2.51
78	2.63	74	2.58	66	1.91	60	1.90
22	1.18	17	.97	17	.90	16	.74
15	.75	14	.55	14	.64	14	.50
13	.58	13	.37	13	.49	12	.37
7	.32	6	.22	5	.18	5	.12
5	.10	4	.07	2	.04		

PARAMETER VALUES

PS : 5.21
(3.52, 6.90)

ALPHA : .050
(.047, .053)

BETA : .0082
(.0005, .0159)

SAMPLE TEMP 24.5°C

INCUBATION TEMP 24.5°C

CHLOROPHYLL : .45

CARBON : 78

NITROGEN : 8

NITRATE : .48

SILICATE : .15

PHOSPHATE : .15

SARGASSO SEA 1988

STATION NO. 418

LAT 39°43.9' N LONG 64° 5.8' W DATE 09/09/88 DEPTH 35 M

I	P	I	P	I	P	I	P
319	.89	247	1.14	211	1.52	187	1.77
159	1.62	151	1.99	82	2.02	72	2.17
58	1.90	48	1.94	44	1.88	25	1.60
18	1.40	18	1.08	16	.94	14	.75
14	.81	13	.70	11	.76	10	.58
9	.49	8	.41	7	.36	5	.33
4	.21	4	.19	4	.18	4	.13
3	.08	2	.08	1	.03	1	.02
1	.03	1	.02	1	.01		

PARAMETER VALUES

PS : 4.09
(3.41, 4.77)

ALPHA : .075
(.072, .078)

BETA : .0195
(.0132, .0258)

SAMPLE TEMP 20.6°C

INCUBATION TEMP 20.6°C

CHLOROPHYLL : .82

CARBON : 92

NITROGEN : 14

NITRATE : 1.10

SILICATE : .21

PHOSPHATE : .12

SARGASSO SEA 1988

STATION NO. 418

LAT 39°43.9' N LONG 64° 5.8' W DATE 09/09/88 DEPTH 45 M

I	P	I	P	I	P	I	P
458	.12	351	.27	303	.44	267	.79
247	1.06	215	1.42	116	1.68	72	1.80
60	1.88	50	1.78	40	1.64	24	1.44
21	1.29	19	1.17	16	.84	15	.80
8	.68	6	.49	5	.43	5	.35
4	.29	4	.21	3	.27	2	.19
2	.13	2	.11	2	.17	1	.09
1	.05	1	.10	1	.09		

PARAMETER VALUES

PS : 3.88 (3.23, 4.53)

ALPHA : .078 (.073, .082)

BETA : .0232 (.0166, .0299)

SAMPLE TEMP 19.2°C INCUBATION TEMP 19.2°C

CHLOROPHYLL : .88 CARBON : 90 NITROGEN : 12

NITRATE : 1.59 SILICATE : .19 PHOSPHATE : 1.30

SARGASSO SEA 1988

STATION NO. 426

LAT 36° .0' N LONG 64° 2.0' W DATE 10/09/88 DEPTH 1 M

I	P	I	P	I	P	I	P
183	4.96	155	5.03	136	4.49	128	4.57
116	3.97	114	4.93	88	4.34	78	3.95
74	2.75	66	2.47	60	2.41	22	1.26
17	1.05	17	.94	14	.42	14	.48
13	.29	13	.40	13	.37	12	.24
6	.12	5	.16	5	.11	5	.09
2	.02						

PARAMETER VALUES

PS : 502.70 ALPHA : .056 BETA : 1.7823

( ) (.047, .065) ( )

SAMPLE TEMP 27.1°C INCUBATION TEMP 27.1°C

CHLOROPHYLL : .14 CARBON : 86 NITROGEN : 12

NITRATE : .63 SILICATE : .09 PHOSPHATE : .00

SARGASSO SEA 1988

STATION NO. 426

LAT 36° .0' N LONG 64° 2.0' W DATE 10/09/88 DEPTH 10 M

I	P	I	P	I	P	I	P
319	5.11	247	4.36	211	4.36	187	4.72
159	4.15	151	4.53	108	3.54	82	3.35
72	2.92	58	2.38	48	2.05	44	1.88
25	1.40	18	1.12	18	.76	16	.62
14	.49	14	.63	13	.51	11	.41
10	.17	9	.18	7	.11	5	.03

PARAMETER VALUES

PS : 6.33
(3.81, 8.85)

ALPHA : .055
(.051, .058)

BETA : .0040
(-.0044, .0124)

SAMPLE TEMP 27.1°C INCUBATION TEMP 27.1°C

CHLOROPHYLL : .14 CARBON : 74 NITROGEN : 9

NITRATE : .71 SILICATE : .08 PHOSPHATE : .00

SARGASSO SEA 1988

STATION NO. 426

LAT 36° .0' N LONG 64° 2.0' W DATE 10/09/88 DEPTH 20 M

I	P	I	P	I	P	I	P
458	4.83	351	4.75	303	4.36	267	3.54
247	4.01	215	3.74	116	2.49	60	1.81
50	1.69	48	1.44	40	1.02	24	.97
21	.84	19	.60	16	.49	15	.57
6	.22	5	.10	4	.08		

PARAMETER VALUES

PS : 4.92 (3.33, 6.51)

ALPHA : .033 (.031, .036)

BETA : .0000 (-.0032, .0032)

SAMPLE TEMP 27.0°C INCUBATION TEMP 27.0°C

CHLOROPHYLL : .14 CARBON : 49 NITROGEN : 8

NITRATE : .43 SILICATE : .05 PHOSPHATE : .00

SARGASSO SEA 1988

STATION NO. 440

LAT 35°59.5' N LONG 64° 6.8' W DATE 11/09/88 DEPTH 30 M

I	P	I	P	I	P	I	P
578	3.78	419	3.58	335	3.35	287	3.86
263	3.23	211	3.71	159	3.48	136	3.10
124	2.72	116	2.80	104	2.18	40	1.31
32	1.06	32	.97	27	.65	26	.80
25	.69	24	.50	24	.40	24	.61
21	.45	19	.49	17	.26	13	.38
11	.31	11	.11	10	.09	9	.09
4	.05	3	.04	3	.02		

PARAMETER VALUES

PS : 5.28 (3.83, 6.74)

ALPHA : .034 (.031, .036)

BETA : .0034 (-.0002, .0070)

SAMPLE TEMP 27.0°C INCUBATION TEMP 27.0°C

CHLOROPHYLL : .16 CARBON : 68 NITROGEN : 8

NITRATE : .67 SILICATE : .08 PHOSPHATE : .04

SARGASSO SEA 1988

STATION NO. 440

LAT 35°59.5' N LONG 64° 6.8' W DATE 11/09/88 DEPTH 40 M

I	P	I	P	I	P	I	P
439	2.56	335	3.08	291	2.98	279	3.08
223	3.24	136	3.01	92	2.50	86	2.11
82	2.28	76	1.93	38	1.15	32	1.01
27	.76	24	.72	22	.60	18	.63
16	.53	15	.35	15	.39	14	.25
8	.27	7	.15	5	.03	2	.03

PARAMETER VALUES

PS : 323.60 ALPHA : .037 BETA : 1.3407

( ) (.035, .038) ( )

SAMPLE TEMP 27.0°C INCUBATION TEMP 27.0°C

CHLOROPHYLL : .18 CARBON : 46 NITROGEN : 6

NITRATE : .65 SILICATE : .06 PHOSPHATE : .00

SARGASSO SEA 1988

STATION NO. 440

LAT 35°59.5' N LONG 64° 6.8' W DATE 11/09/88 DEPTH 50 M

I	P	I	P	I	P	I	P
478	1.87	359	2.11	279	2.32	231	2.75
195	2.54	114	2.53	88	2.38	70	1.62
58	1.90	50	1.37	46	1.37	38	1.45
28	1.10	24	.90	21	.84	20	.71
14	.59	8	.33	7	.21	7	.17
6	.14	4	.06				

PARAMETER VALUES

PS : 4.44	ALPHA : .044	BETA : .0083
(3.56, 5.31)	(.041, .046)	(.0044, .0123)

SAMPLE TEMP 26.6°C INCUBATION TEMP 26.6°C

CHLOROPHYLL : .26	CARBON : 61	NITROGEN : 8
NITRATE : .70	SILICATE : .06	PHOSPHATE : .00

SARGASSO SEA 1988

STATION NO. 457

LAT 35°56.4' N LONG 64°27.5' W DATE 12/09/88 DEPTH 60 M

I	P	I	P	I	P	I	P
578	.37	419	.40	335	1.15	287	1.48
239	1.46	211	1.48	136	1.48	124	1.32
40	1.15	32	.99	32	1.05	27	.77
26	.79	25	.77	24	.65	24	.62
24	.59	21	.61	19	.53	17	.48
11	.32	11	.30	10	.26	9	.25
8	.22	4	.10	3	.07	3	.07
3	.06	3	.06	2	.04		

PARAMETER VALUES

PS : 4.37 ALPHA : .034 BETA : .0182

(2.51, 6.23) (.032, .036) (.0059, .0306)

SAMPLE TEMP 26.2°C INCUBATION TEMP 26.2°C

CHLOROPHYLL : .38 CARBON : 49 NITROGEN : 7

NITRATE : .11 SILICATE : .07 PHOSPHATE : .00

SARGASSO SEA 1988

STATION NO. 457

LAT 35°56.4' N LONG 64°27.5' W DATE 12/09/88 DEPTH 70 M

I	P	I	P	I	P	I	P
439	.34	335	.61	291	.77	279	1.08
255	1.21	223	1.40	136	1.33	104	1.29
92	1.43	82	1.24	76	1.27	38	1.16
32	.95	27	.94	24	.82	22	.59
21	.67	15	.41	14	.42	8	.33
7	.29	6	.24	6	.15	5	.10
5	.11	2	.08	2	.07	2	.05
2	.05	2	.07	1	.03		

PARAMETER VALUES

PS : 3.24
(2.23, 4.25)

ALPHA : .038
(.035, .040)

BETA : .0140
(.0065, .0215)

SAMPLE TEMP 24.3°C

INCUBATION TEMP 24.3°C

CHLOROPHYLL : .49

CARBON : 54

NITROGEN : 9

NITRATE : .15

SILICATE : .07

PHOSPHATE : .00

SARGASSO SEA 1988

STATION NO. 457

LAT 35°56.4' N LONG 64°27.5' W DATE 12/09/88 DEPTH 80 M

I	P	I	P	I	P	I	P
478	.03	359	.15	279	.25	231	.55
207	.80	195	1.02	114	1.20	88	1.30
70	1.30	50	1.24	38	1.13	28	1.18
24	.97	21	.93	20	.79	14	.79
8	.52	7	.46	7	.37	6	.28
6	.24	4	.20	3	.13	2	.08
2	.08	2	.07	2	.10	2	.04

PARAMETER VALUES

PS : 3.09
(2.40, 3.77)

ALPHA : .059
(.056, .062)

BETA : .0220
(.0139, .0302)

SAMPLE TEMP 23.6°C

INCUBATION TEMP 23.6°C

CHLOROPHYLL : .51

CARBON : 67

NITROGEN : 7

NITRATE : .19

SILICATE : .09

PHOSPHATE : .00

SARGASSO SEA 1988

STATION NO. 490

LAT 35°54.8' N LONG 64°49.9' W DATE 14/09/88 DEPTH 90 M

I	P	I	P	I	P	I	P
578	.04	419	.05	335	.07	287	.14
263	.17	239	.23	211	.25	159	.34
136	.54	124	.72	116	.53	104	.70
40	.91	32	.95	32	.97	27	.90
26	.87	25	.95	24	.77	24	.80
24	.80	21	.84	19	.72	13	.60
11	.64	11	.60	9	.51	8	.45
4	.27	3	.22	3	.23	3	.17
3	.14	2	.13	.9	.06	.7	.05
.6	.05	.4	.04	.3	.03	.3	.03

PARAMETER VALUES

PS : 1.62
(1.48, 1.76)

ALPHA : .071
(.067, .073)

BETA : .0137
(.0114, .0159)

SAMPLE TEMP 22.6°C

INCUBATION TEMP 22.6°C

CHLOROPHYLL : .57

CARBON : 46

NITROGEN : 5

NITRATE : .01

SILICATE : .06

PHOSPHATE : .24

SARGASSO SEA 1988

STATION NO. 490

LAT 35°54.8' N LONG 64°49.9' W DATE 14/09/88 DEPTH 100 M

I	P	I	P	I	P	I	P
439	.00	335	.03	291	.08	279	.06
255	.08	223	.16	136	.28	104	.35
92	.45	86	.48	82	.53	76	.56
38	.74	32	.76	27	.71	24	.82
22	.71	18	.81	16	.76	15	.61
15	.72	15	.70	14	.74	8	.66
7	.61	6	.48	6	.45	5	.38
5	.31	2	.21	2	.15	2	.12
2	.12	2	.11	1	.09	.9	.09
.7	.10	.6	.09	.6	.08	.5	.05

PARAMETER VALUES

PS : 1.06
(1.00, 1.11)

ALPHA : .109
(.104, .115)

BETA : .0099
(.0087, .0112)

SAMPLE TEMP 22.3°C

INCUBATION TEMP 22.3°C

CHLOROPHYLL : .49

CARBON : 34

NITROGEN : 4

NITRATE : .08

SILICATE : .06

PHOSPHATE : .66

SARGASSO SEA 1988

STATION NO. 490

LAT 35°54.8' N LONG 64°49.9' W DATE 14/09/88 DEPTH 110 M

I	P	I	P	I	P	I	P
478	.00	359	.00	279	.00	231	.00
207	.01	195	.02	114	.12	88	.10
70	.26	58	.29	50	.34	46	.32
38	.40	28	.57	24	.53	21	.65
20	.66	14	.65	8	.68	7	.69
7	.62	6	.55	6	.54	6	.51
4	.39	3	.33	2	.33	2	.27
2	.32	2	.22	2	.25	1	.22
1	.20	1	.20				

PARAMETER VALUES

PS : 1.04
(.97, 1.10)

ALPHA : .167
(.160, .173)

BETA : .0237
(.0204, .0270)

SAMPLE TEMP 21.6°C

INCUBATION TEMP 21.6°C

CHLOROPHYLL : .27

CARBON : 92

NITROGEN : 5

NITRATE : .01

SILICATE : .06

PHOSPHATE : .94

SARGASSO SEA 1988

STATION NO. 534

LAT 35°55.7' N LONG 65°16.3' W DATE 16/09/88 DEPTH 1 M

I	P	I	P	I	P	I	P
578	3.98	419	3.95	335	4.20	263	4.53
239	4.16	211	3.93	159	3.60	136	3.66
124	3.18	104	3.08	40	1.73	32	1.26
32	1.32	27	1.01	26	.99	25	.84
24	.74	24	.85	24	.60	21	.67
19	.55	17	.66	13	.51	11	.31
10	.25	9	.15	8	.16	4	.05
3	.10	3	.07	3	.05	3	.06
2	.04						

PARAMETER VALUES

PS : 6.67 (5.53, 7.82)

ALPHA : .042 (.040, .044)

BETA : .0061 (.0030, .0092)

SAMPLE TEMP 26.4°C

INCUBATION TEMP 26.4°C

CHLOROPHYLL : .18

CARBON : 52

NITROGEN : 7

NITRATE : .56

SILICATE : .06

PHOSPHATE : .00

SARGASSO SEA 1988

STATION NO. 534

LAT 35°55.7' N LONG 65°16.3' W DATE 16/09/88 DEPTH 10 M

I	P	I	P	I	P	I	P
335	3.72	291	3.98	279	3.53	255	3.80
223	3.54	136	3.66	104	3.44	92	3.49
86	2.72	82	2.62	76	2.57	38	1.79
32	1.19	24	.79	22	.62	21	.54
15	.53	15	.62	15	.44	14	.34
8	.16	6	.03	5	.03		

PARAMETER VALUES

PS : 415.00 ( )

ALPHA : .048 (.043, .052)

BETA : 1.8396 ( )

SAMPLE TEMP 26.4°C

INCUBATION TEMP 26.4°C

CHLOROPHYLL : .18

CARBON : 43

NITROGEN : 5

NITRATE : .58

SILICATE : .06

PHOSPHATE : .00

SARGASSO SEA 1988

STATION NO. 534

LAT 35°55.7' N LONG 65°16.3' W DATE 16/09/88 DEPTH 20 M

I	P	I	P	I	P	I	P
478	3.85	279	3.56	207	3.89	195	3.79
114	2.84	88	2.58	70	2.52	58	1.99
50	1.52	46	1.52	38	1.35	28	1.16
24	.91	21	.91	14	.47	4	.24
3	.12	2	.12				

PARAMETER VALUES

PS : 4.61
(3.98, 5.23)

ALPHA : .045
(.043, .047)

BETA : .0018
(.0000, .0035)

SAMPLE TEMP 26.4°C

INCUBATION TEMP 26.4°C

CHLOROPHYLL : .21

CARBON : 65

NITROGEN : 8

NITRATE : .68

SILICATE : .05

PHOSPHATE : .00

SARGASSO SEA 1988

STATION NO. 569

LAT 36° 5.6' N LONG 65°41.7' W DATE 18/09/88 DEPTH 30 M

I	P	I	P	I	P	I	P
578	2.89	335	3.04	287	3.11	263	3.13
239	3.11	159	3.07	136	2.65	124	2.51
116	2.27	104	2.11	40	1.04	32	.94
32	.78	27	.73	26	.78	25	.55
24	.48	24	.65	24	.44	21	.52
19	.43	17	.39	13	.38	11	.23
10	.20	8	.16	3	.07	3	.00
3	.03	3	.03	2	.01		

PARAMETER VALUES

PS : 5.73
(4.39, 7.07)

ALPHA : .030
(.029, .031)

BETA : .0066
(.0029, .0104)

SAMPLE TEMP 26.2°C

INCUBATION TEMP 26.2°C

CHLOROPHYLL : .19

CARBON : 57

NITROGEN : 5

NITRATE : .64

SILICATE : .08

PHOSPHATE : .01

SARGASSO SEA 1988

STATION NO. 569

LAT 36° 5.6' N LONG 65°41.7' W DATE 18/09/88 DEPTH 40 M

I	P	I	P	I	P	I	P
439	3.02	291	2.82	279	3.05	255	2.81
223	2.81	136	2.80	104	2.17	92	2.05
86	2.36	82	2.08	76	1.77	38	1.43
32	1.10	27	.92	24	.71	22	.59
21	.52	18	.69	16	.65	15	.41
14	.31	8	.25	6	.14	6	.05

PARAMETER VALUES

PS : 3.24
(2.77, 3.71)

ALPHA : .039
(.037, .041)

BETA : .0007
(-.0007, .0021)

SAMPLE TEMP 26.2°C

INCUBATION TEMP 26.2°C

CHLOROPHYLL : .18

CARBON : 35

NITROGEN : 2

NITRATE : 1.19

SILICATE : .06

PHOSPHATE : .01

SARGASSO SEA 1988

LAT 36° 5.6' N STATION NO. 569 LONG 65°41.7' W DATE 18/09/88 DEPTH 50 M

I	P	I	P	I	P	I	P
478							
195	.58						
46	1.28	359	1.00				
20	1.05	114	1.45	279	1.35		
6	.55	38	.83	58	1.12	231	1.29
3	.30	14	.55	28	.82	50	1.25
	.01	6	.10	8	.28	21	.69
		2	.03	6	.08	7	.19
						4	.07

PARAMETER VALUES

PS : 2.52
(2.08, 2.96)

ALPHA : .035
(.033, .037)

BETA : .0068
(.0042, .0093)

SAMPLE TEMP 26.1°C

INCUBATION TEMP 26.1°C

CHLOROPHYLL : .40

CARBON : 43

NITROGEN : 3

NITRATE : .37

SILICATE : .06

PHOSPHATE : .03

SARGASSO SEA 1988

LAT 36°10.5' N LONG 65°50.1' W STATION NO. 585 DATE 19/09/88 DEPTH 60 M

I	P	I	P	I	P	I	P
419		335		287		239	
211	.54	136	.97	124	1.11	116	1.38
104	1.27	40	1.57	32	1.48	32	1.32
27	1.37	26	1.05	25	.77	24	.97
24	.77	24	.72	21	.57	17	.62
13	.53	11	.52	11	.51	9	.42
4	.44	3	.38		.30		.22
	.10		.02				

PARAMETER VALUES

PS : 4.15
(2.41, 5.88)

ALPHA : .032
(.030, .033)

BETA : .0178
(.0060, .0296)

SAMPLE TEMP 24.4°C

INCUBATION TEMP 24.4°C

CHLOROPHYLL : .36

CARBON : 59

NITROGEN : 5

NITRATE : .12

SILICATE : .03

PHOSPHATE : .05

SARGASSO SEA 1988

STATION NO. 585

LAT 36°10.5' N LONG 65°50.1' W DATE 19/09/88 DEPTH 70 M

I	P	I	P	I	P	I	P
439	.03	335	.14	291	.34	279	.59
255	.72	136	.88	104	1.21	92	1.24
86	1.25	82	1.20	76	1.17	38	.99
32	1.16	27	.99	24	.87	22	1.06
21	.72	18	.91	16	.80	15	.46
15	.69	15	.51	14	.61	8	.42
7	.33	6	.27	6	.22	5	.20
5	.17	2	.06	2	.09	2	.04
2	.02						

PARAMETER VALUES

PS : 2.39 (2.01, 2.77)

ALPHA : .056 (.053, .059)

BETA : .0146 (.0103, .0190)

SAMPLE TEMP 23.3°C INCUBATION TEMP 23.3°C

CHLOROPHYLL : .54 CARBON : 48 NITROGEN : 4

NITRATE : .14 SILICATE : .05 PHOSPHATE : .04

SARGASSO SEA 1988

STATION NO. 585

LAT 36°10.5' N LONG 65°50.1' W DATE 19/09/88 DEPTH 80 M

I	P	I	P	I	P	I	P
478	.00	359	.12	279	.23	231	.37
207	.53	195	.77	114	1.00	88	1.16
70	1.27	58	1.19	50	1.20	46	1.16
38	1.20	28	1.14	24	1.10	21	.95
20	.79	14	.72	8	.50	7	.40
7	.35	6	.21	6	.25	6	.19
4	.15	3	.11	2	.05	2	.00

PARAMETER VALUES

PS : 2.83 ALPHA : .062 BETA : .0231

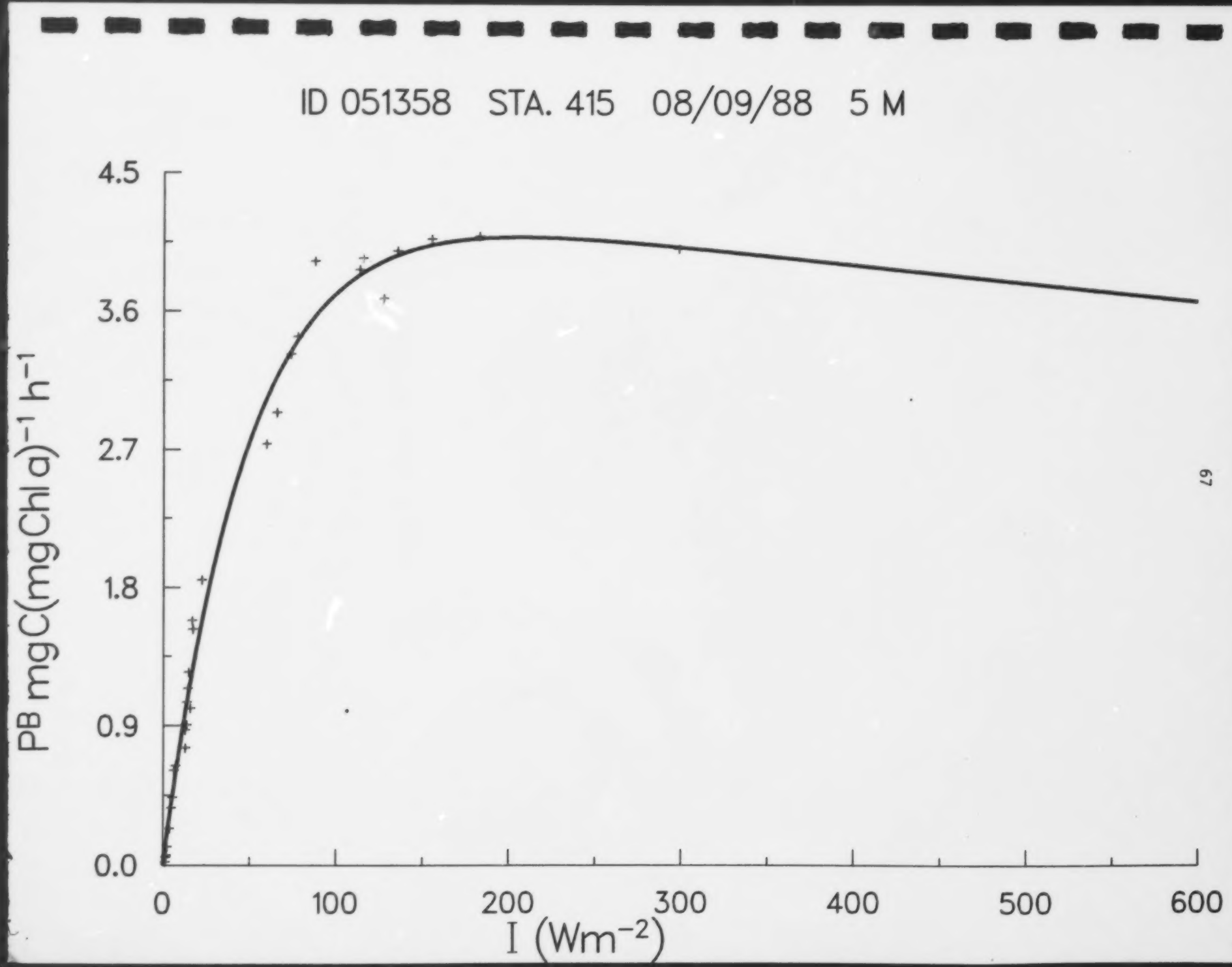
(2.26, 3.41) (.058, .065) (.0152, .0309)

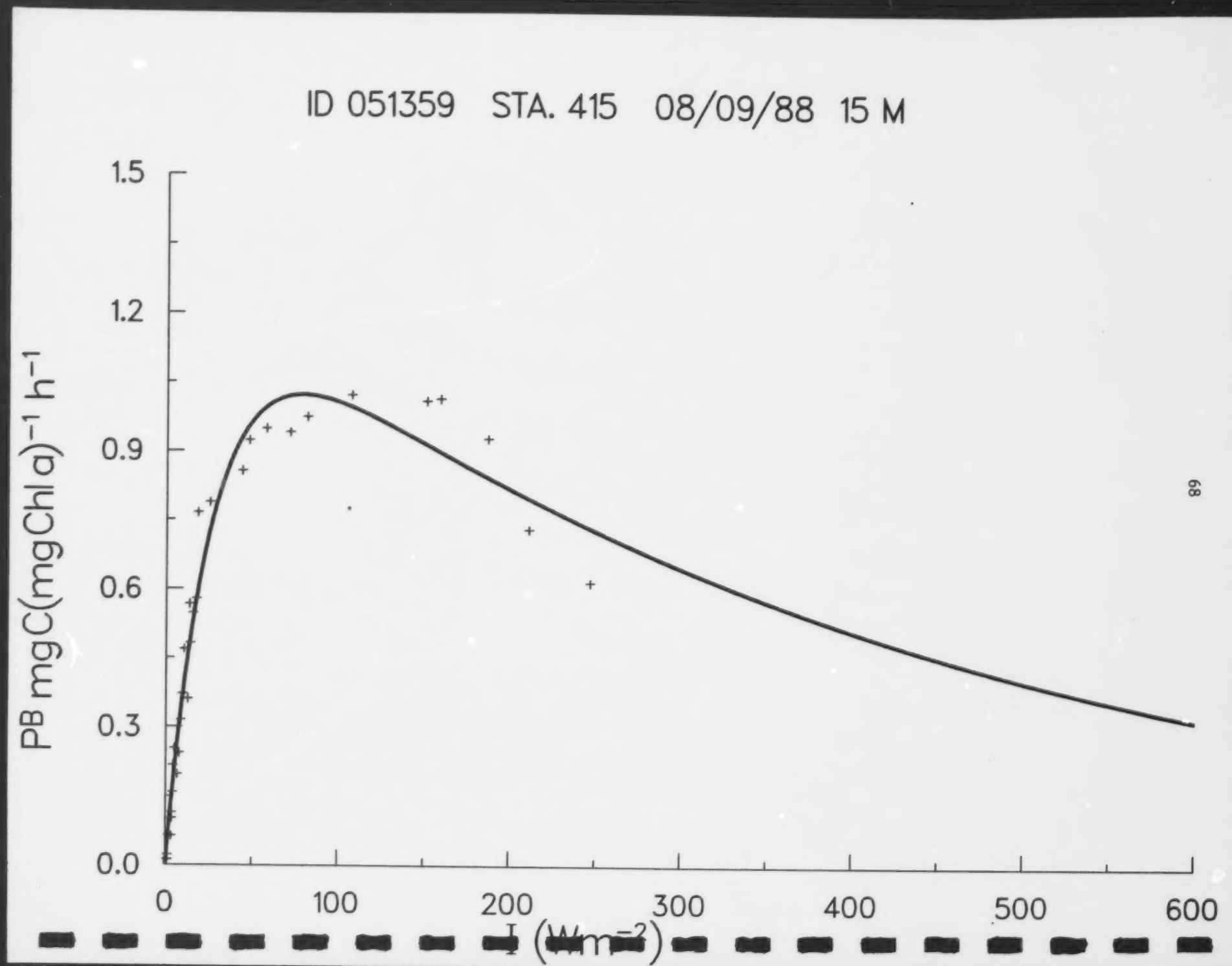
SAMPLE TEMP 23.1°C INCUBATION TEMP 23.1°C

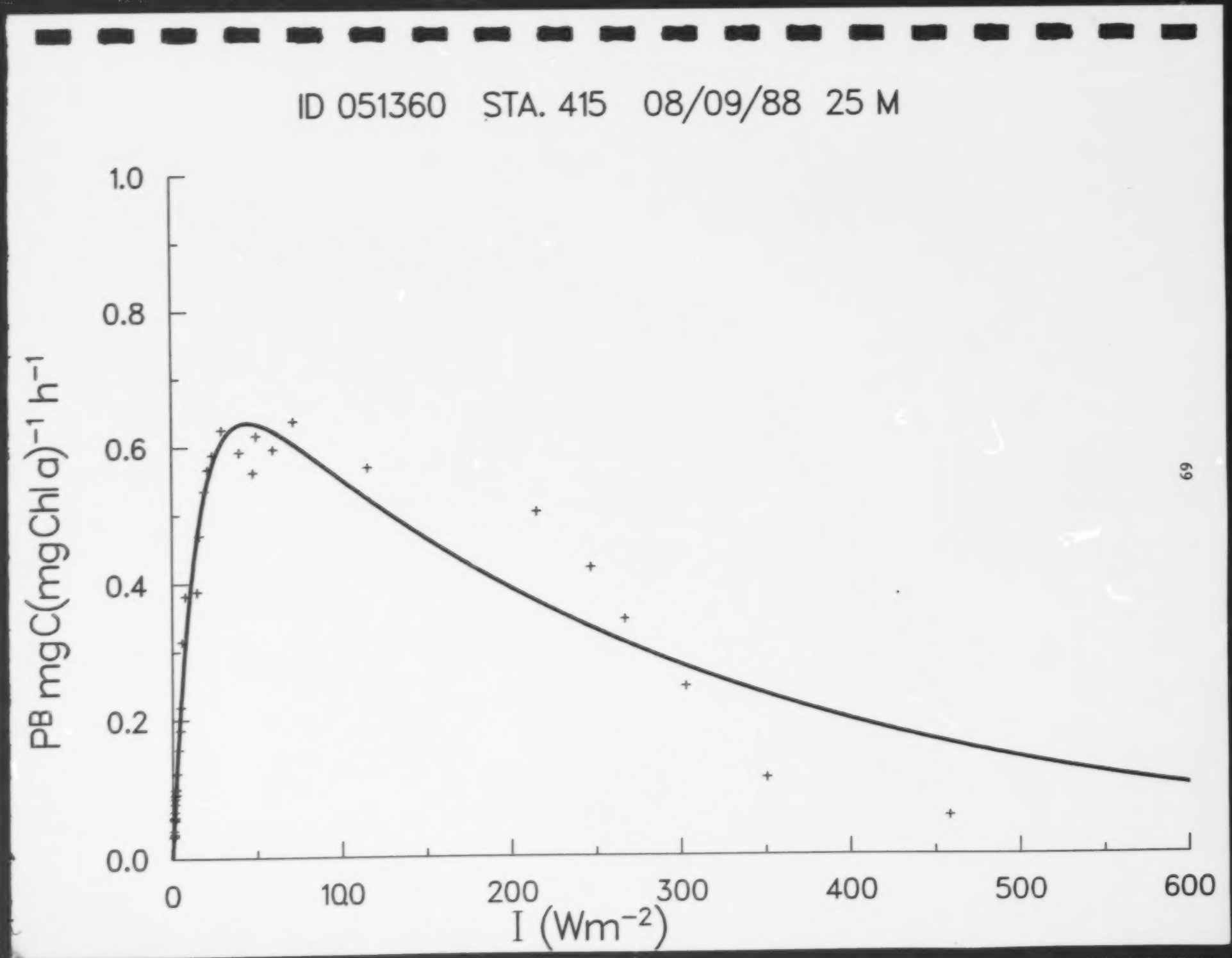
CHLOROPHYLL : .63 CARBON : 40 NITROGEN : 5

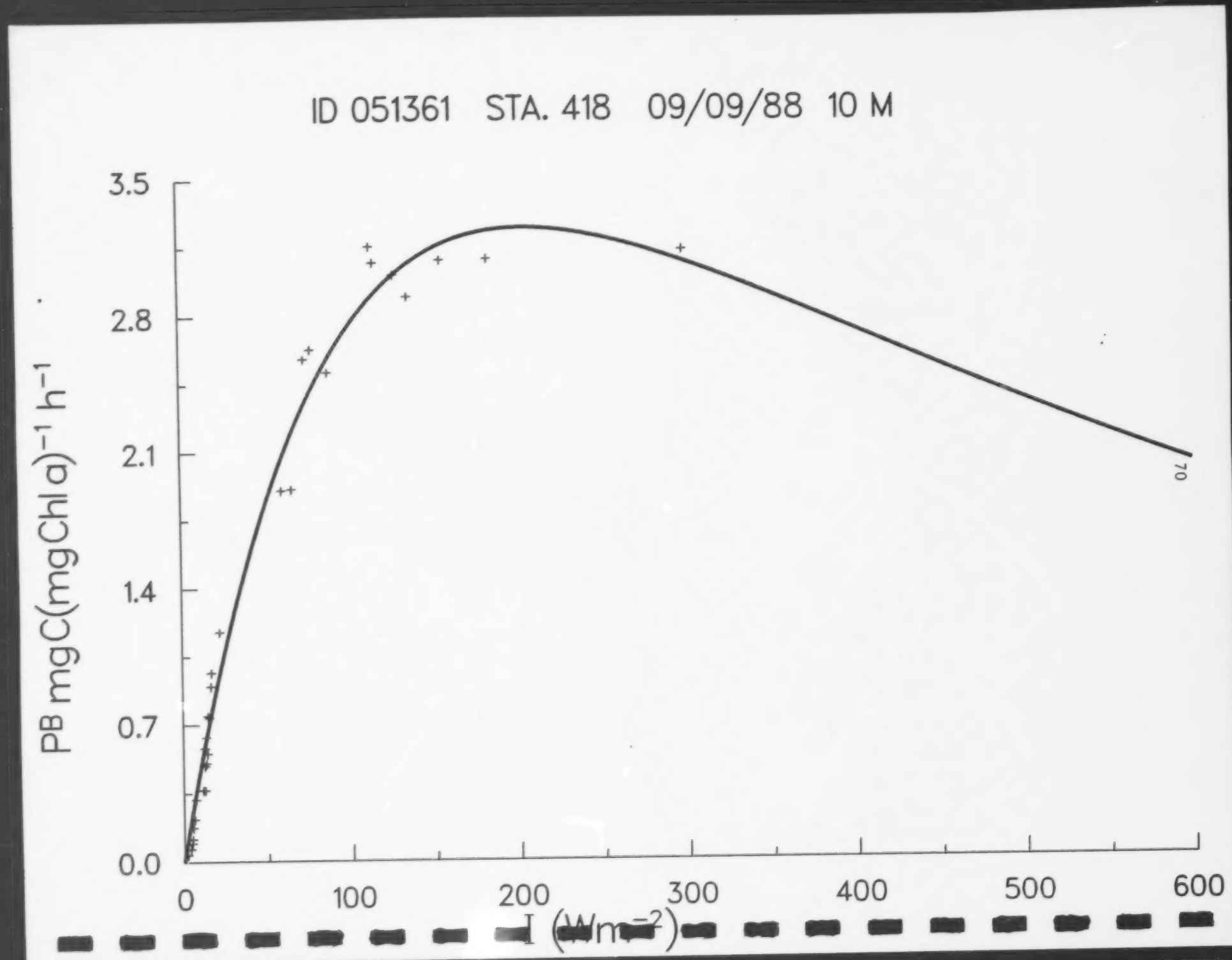
NITRATE : .68 SILICATE : .04 PHOSPHATE : .04

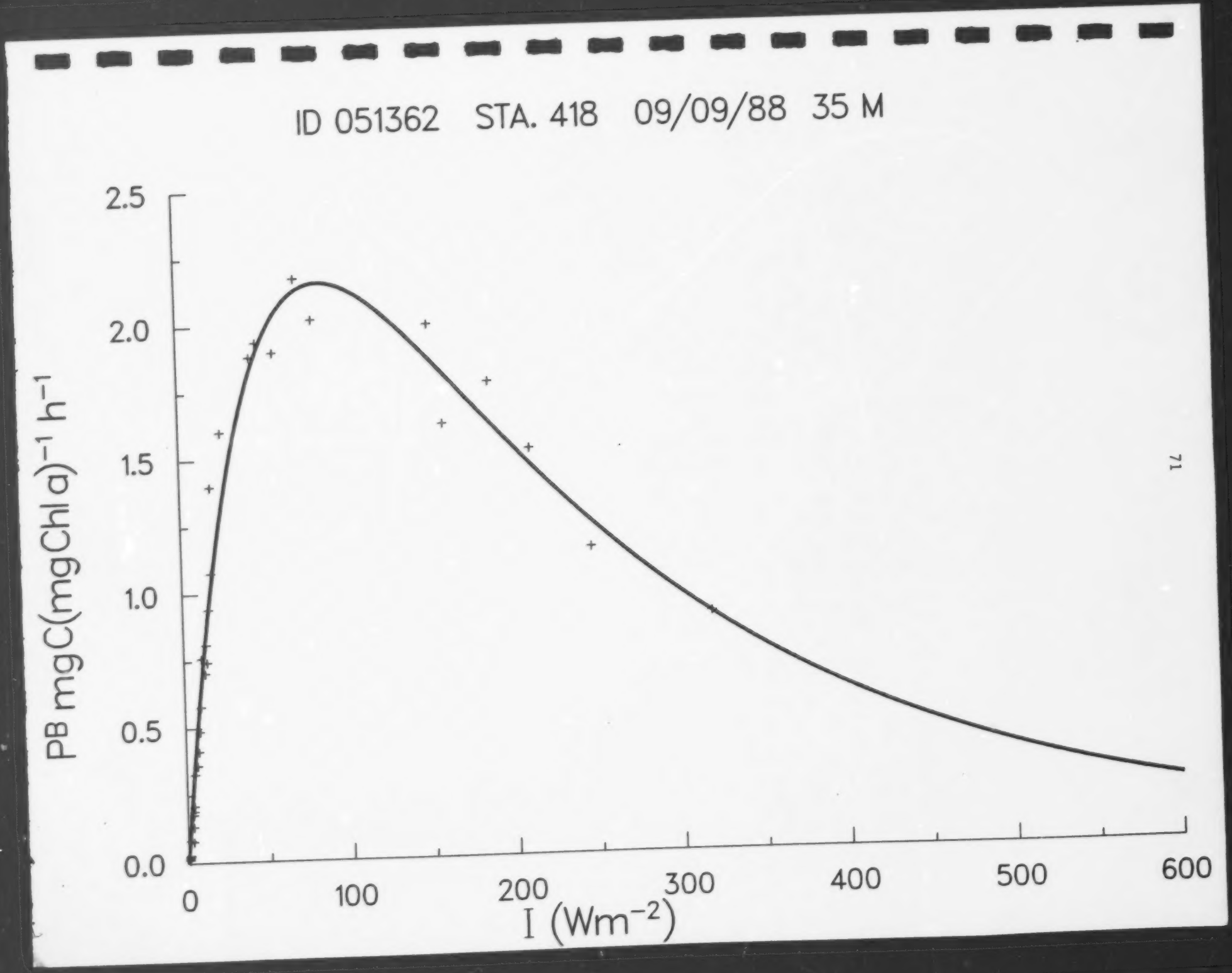
SOLID LINE FIT TO PI DATA

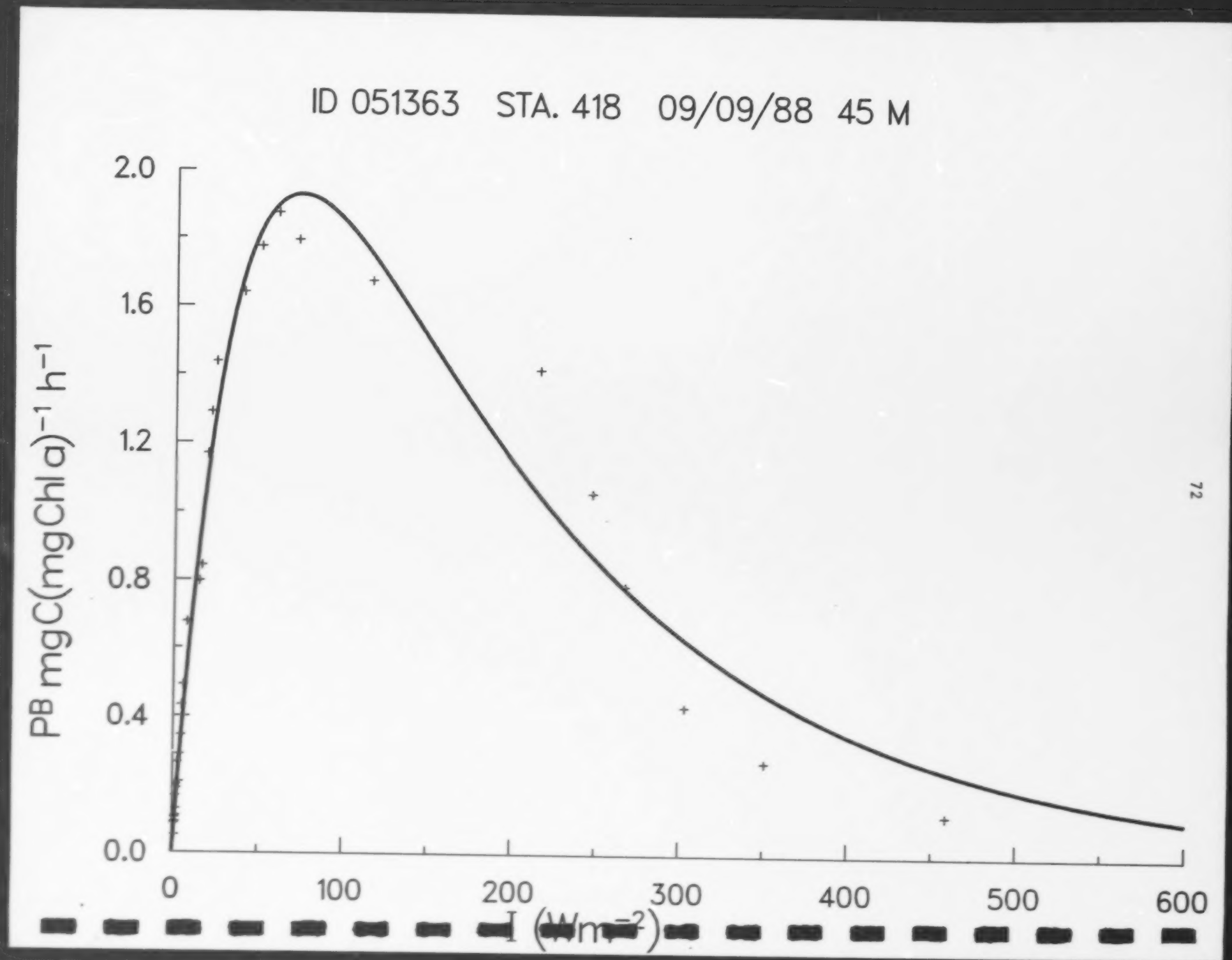

ID 051358 STA. 415 08/09/88 5 M
4.5
3.6
2.7
1.8
0.9
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
67

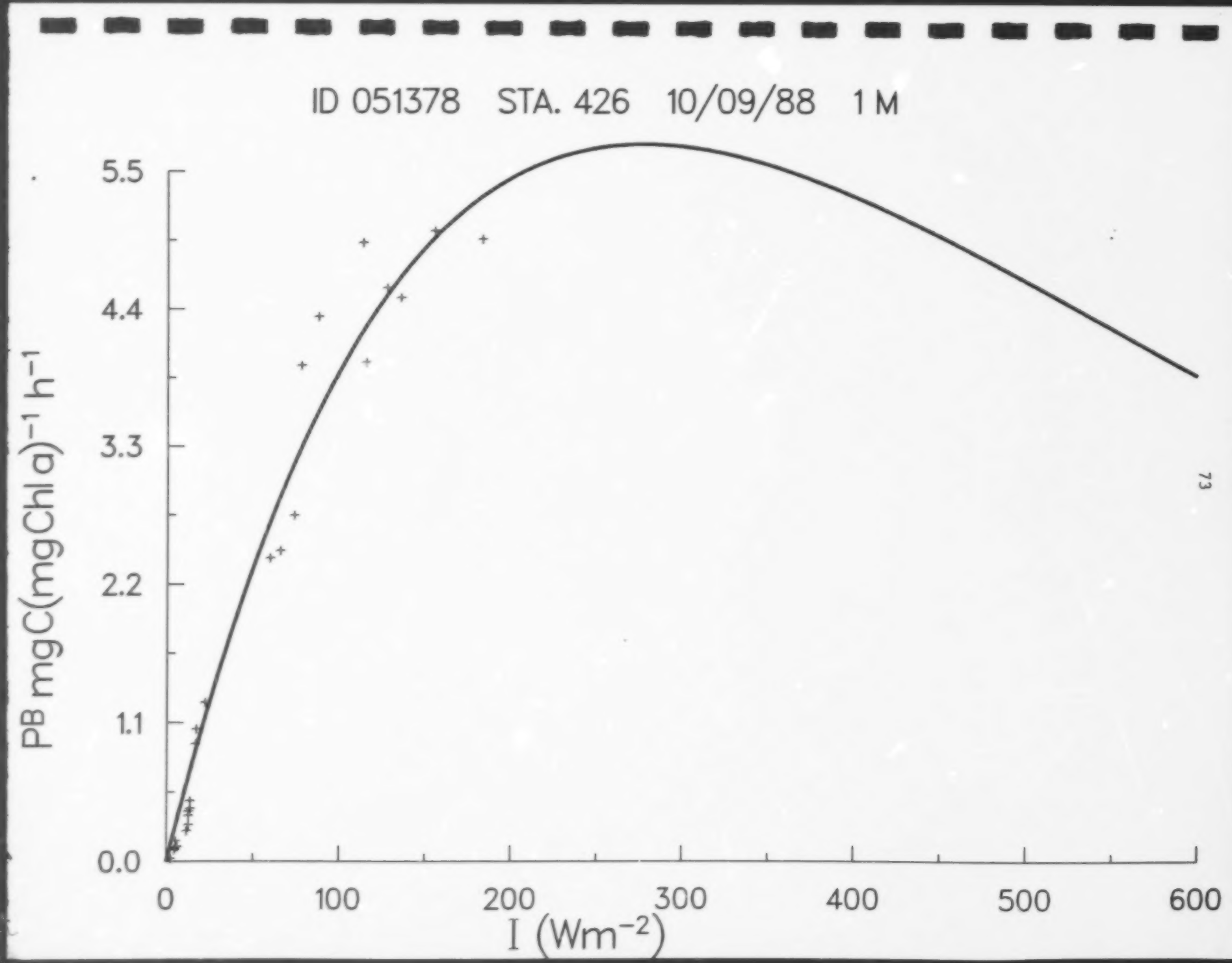

ID 051359 STA. 415 08/09/88 15 M
1.5
1.2
0.9
0.6
0.3
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
89

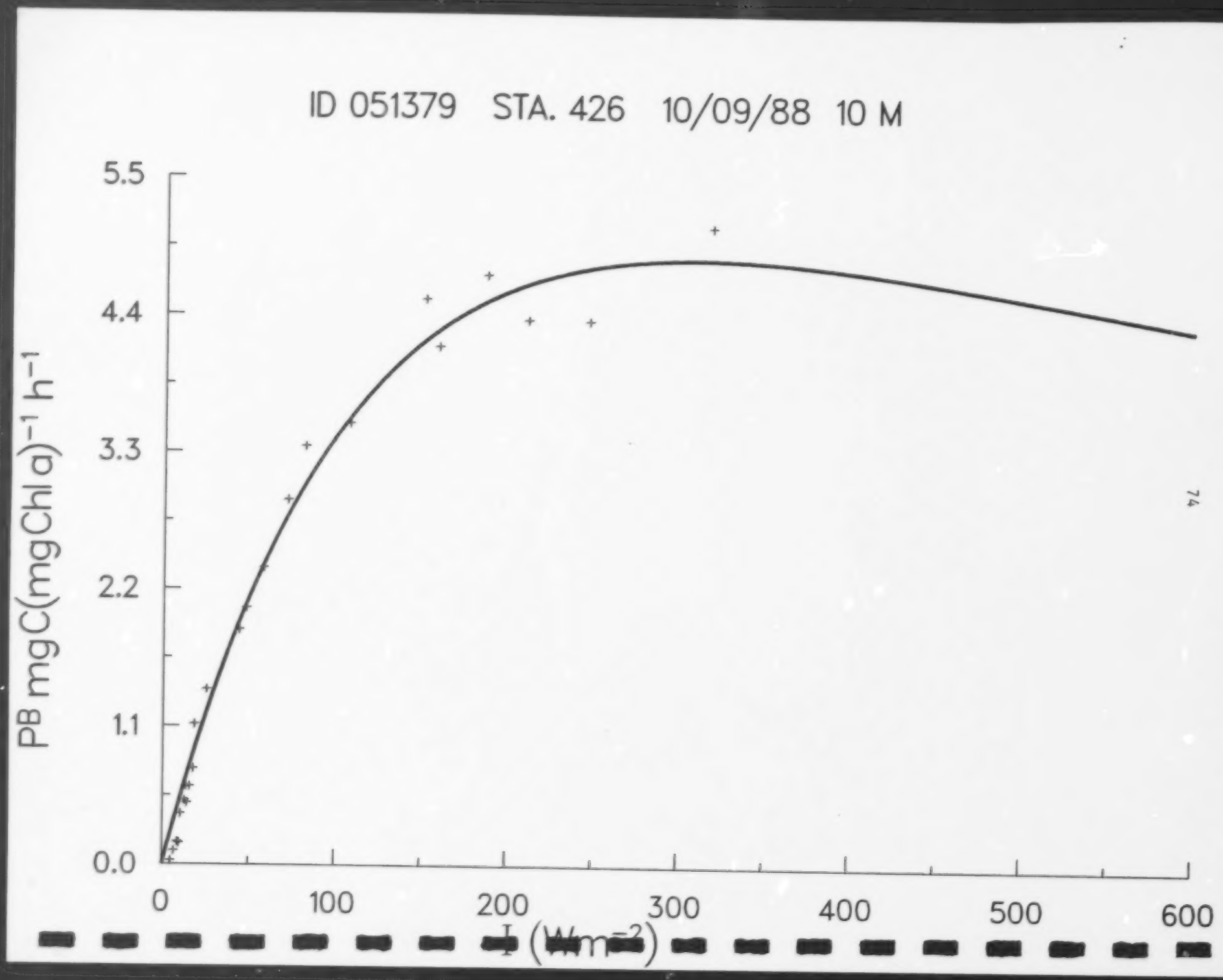

ID 051360 STA. 415 08/09/88 25 M
1.0
0.8
0.6
0.4
0.2
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
69

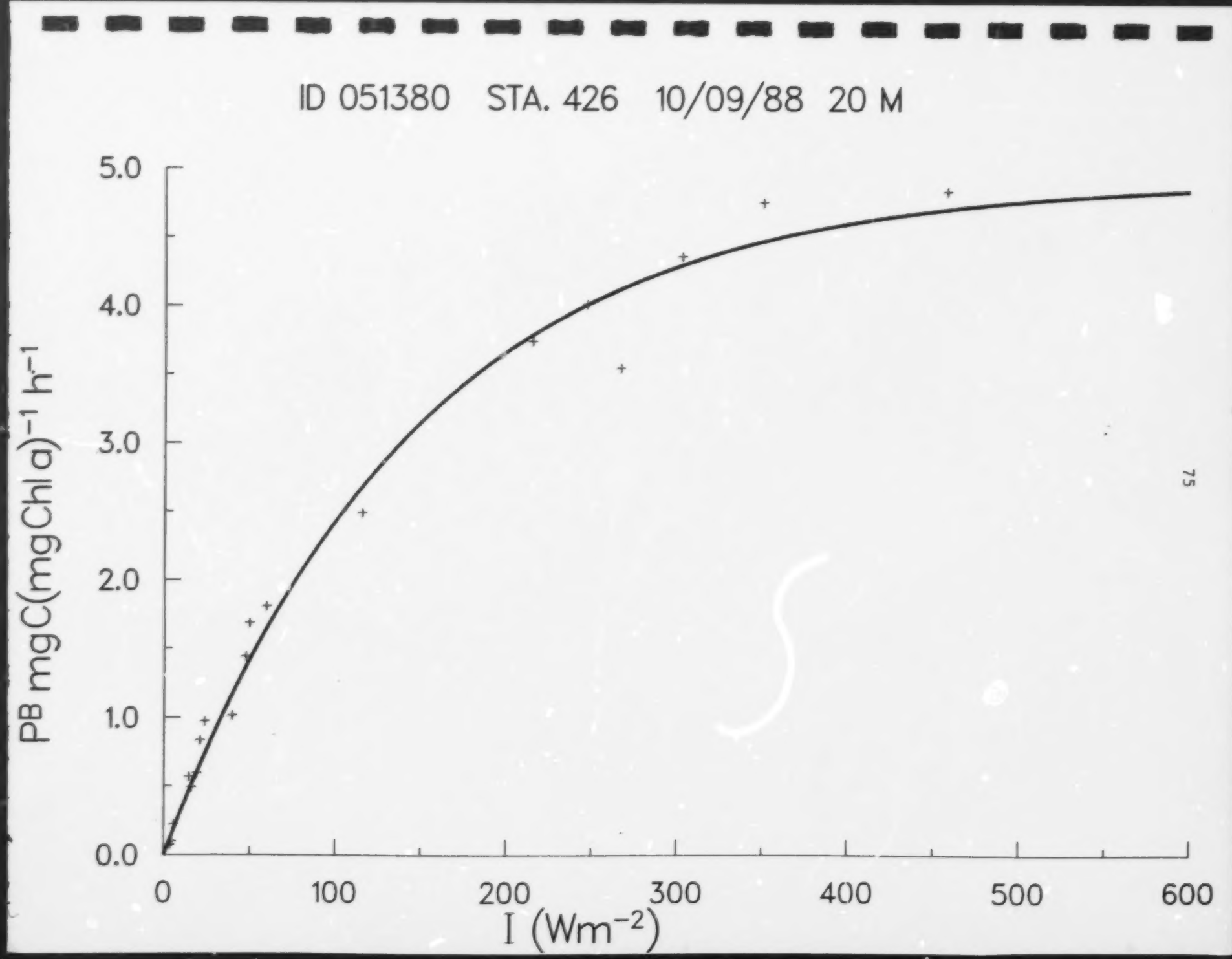

ID 051361 STA. 418 09/09/88 10 M
3.5
2.8
2.1
1.4
0.7
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
70

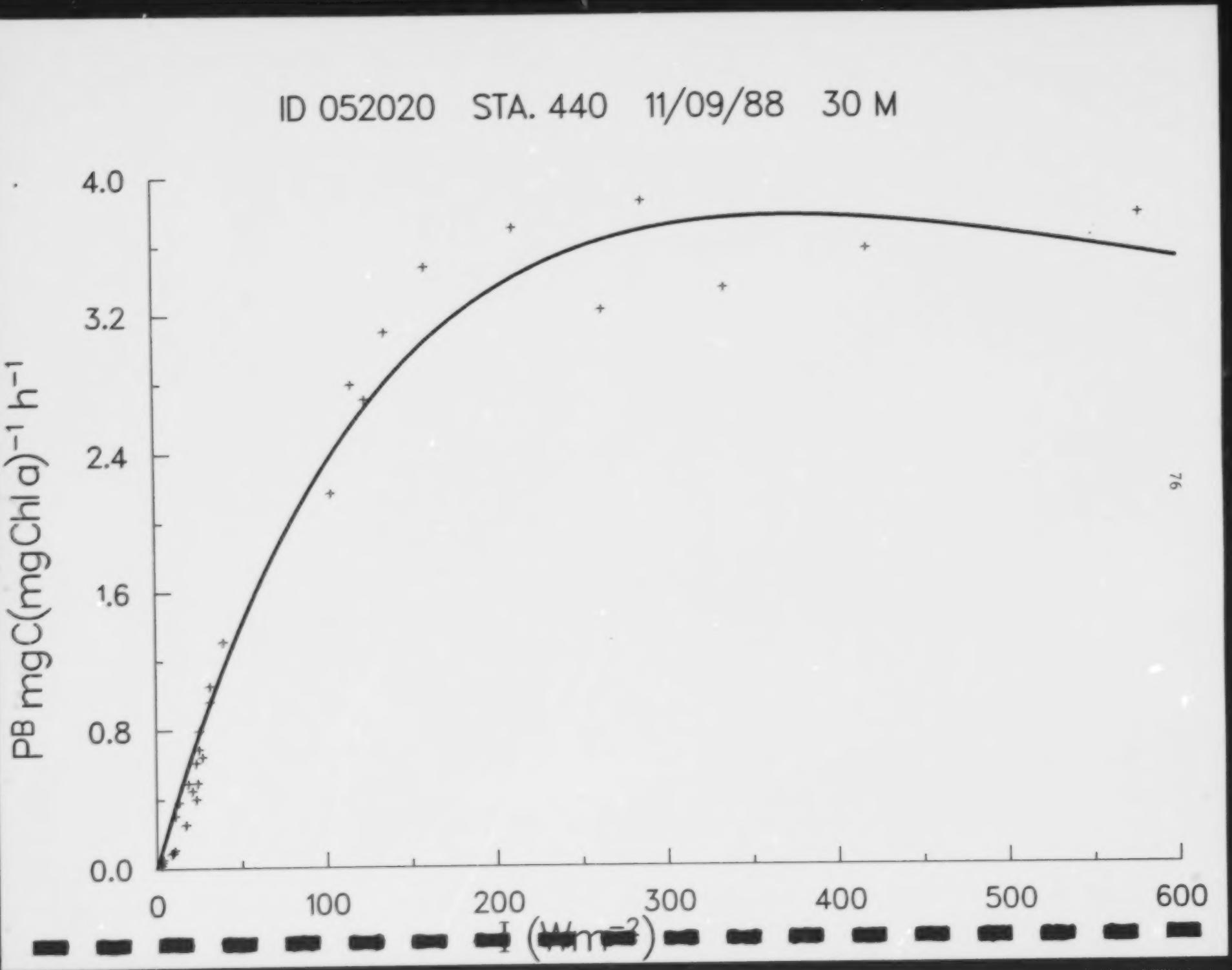

ID 051362 STA. 418 09/09/88 35 M
PB mgC(mgChl a)$^{-1}$ h^{-1}
2.5
2.0
1.5
1.0
0.5
0.0
0
100
200
300
400
500
600
I (Wm^{-2})

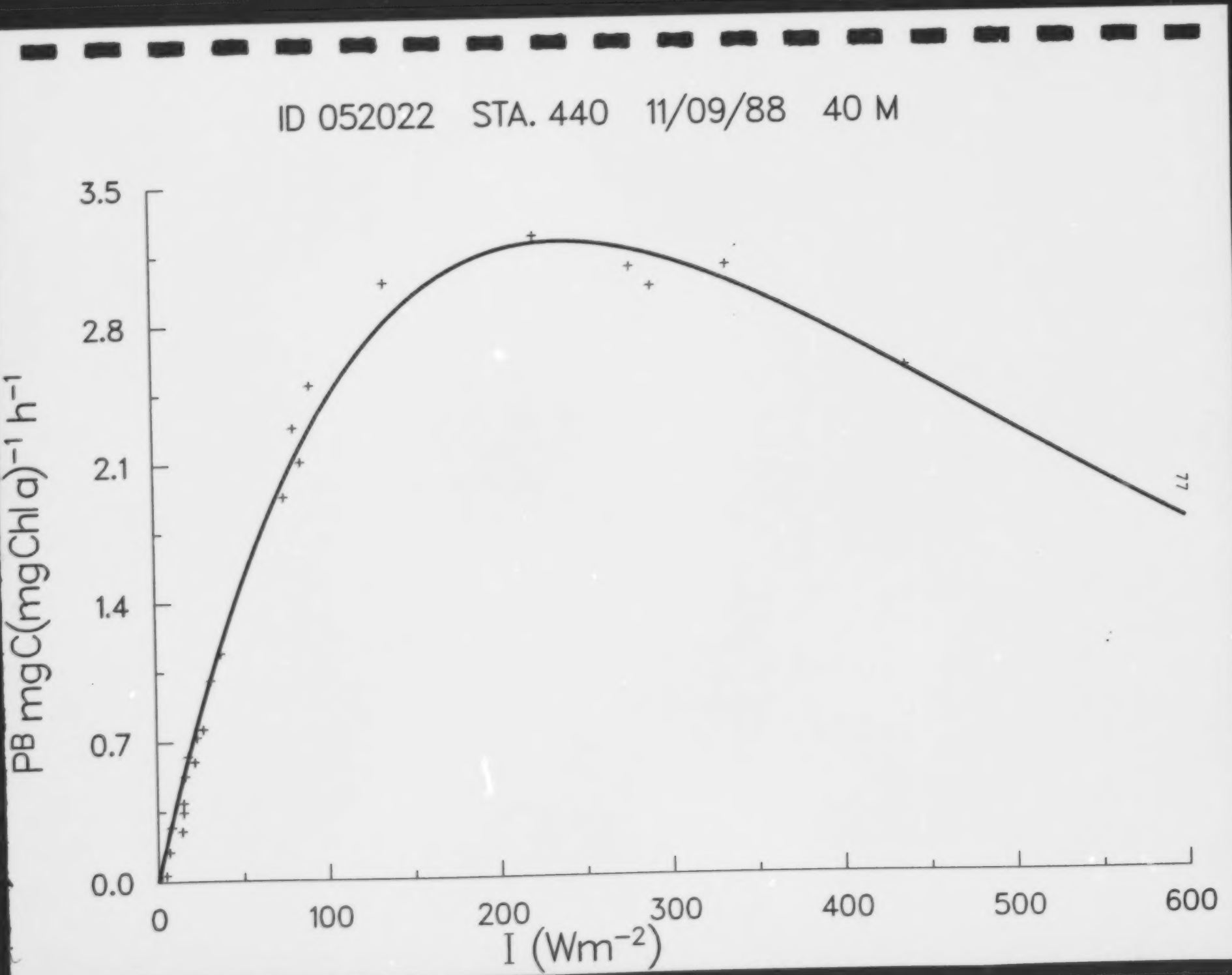

ID 051363 STA. 418 09/09/88 45 M
2.0
1.6
1.2
0.8
0.4
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})

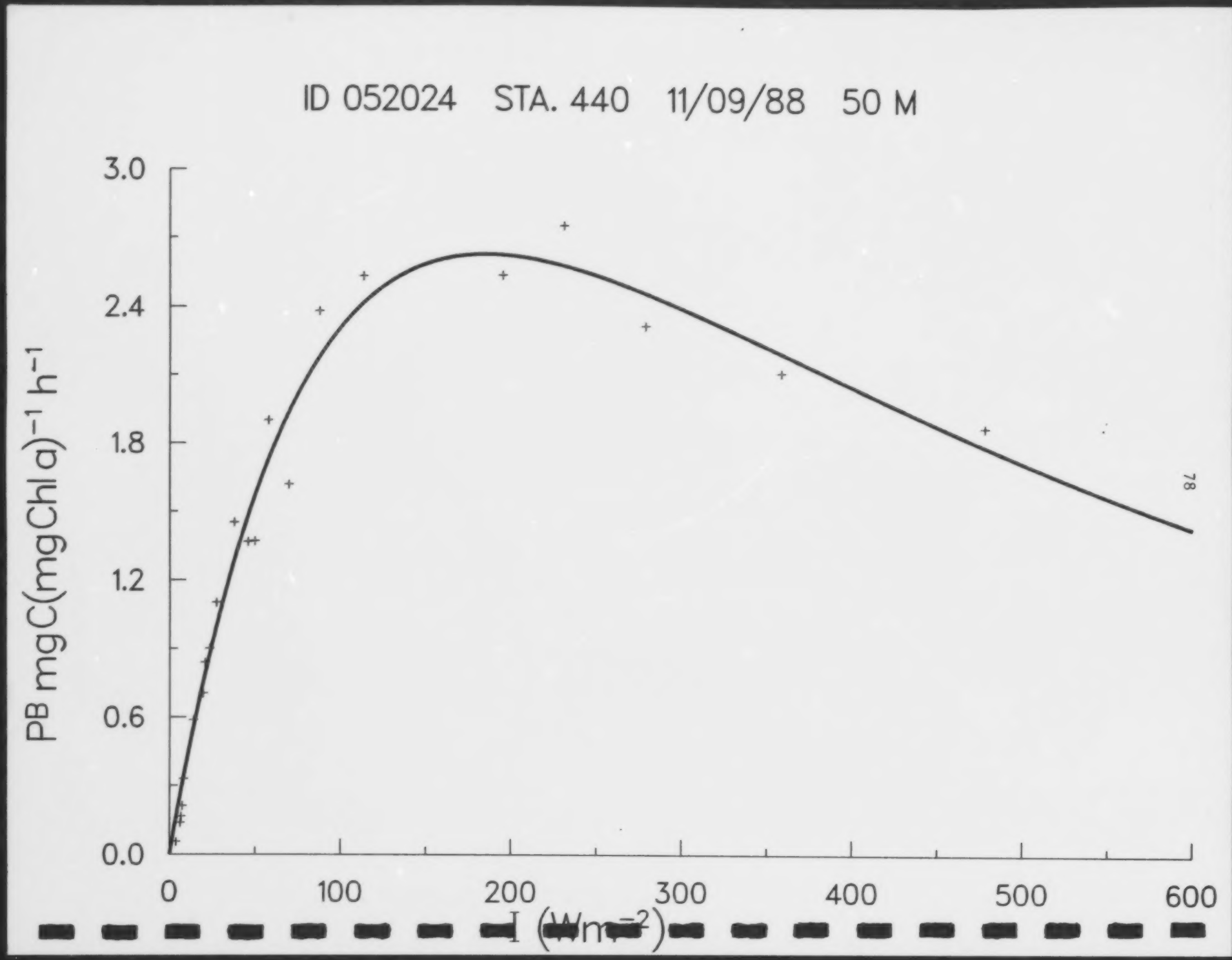

ID 051378 STA. 426 10/09/88 1 M
5.5
4.4
3.3
2.2
1.1
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})

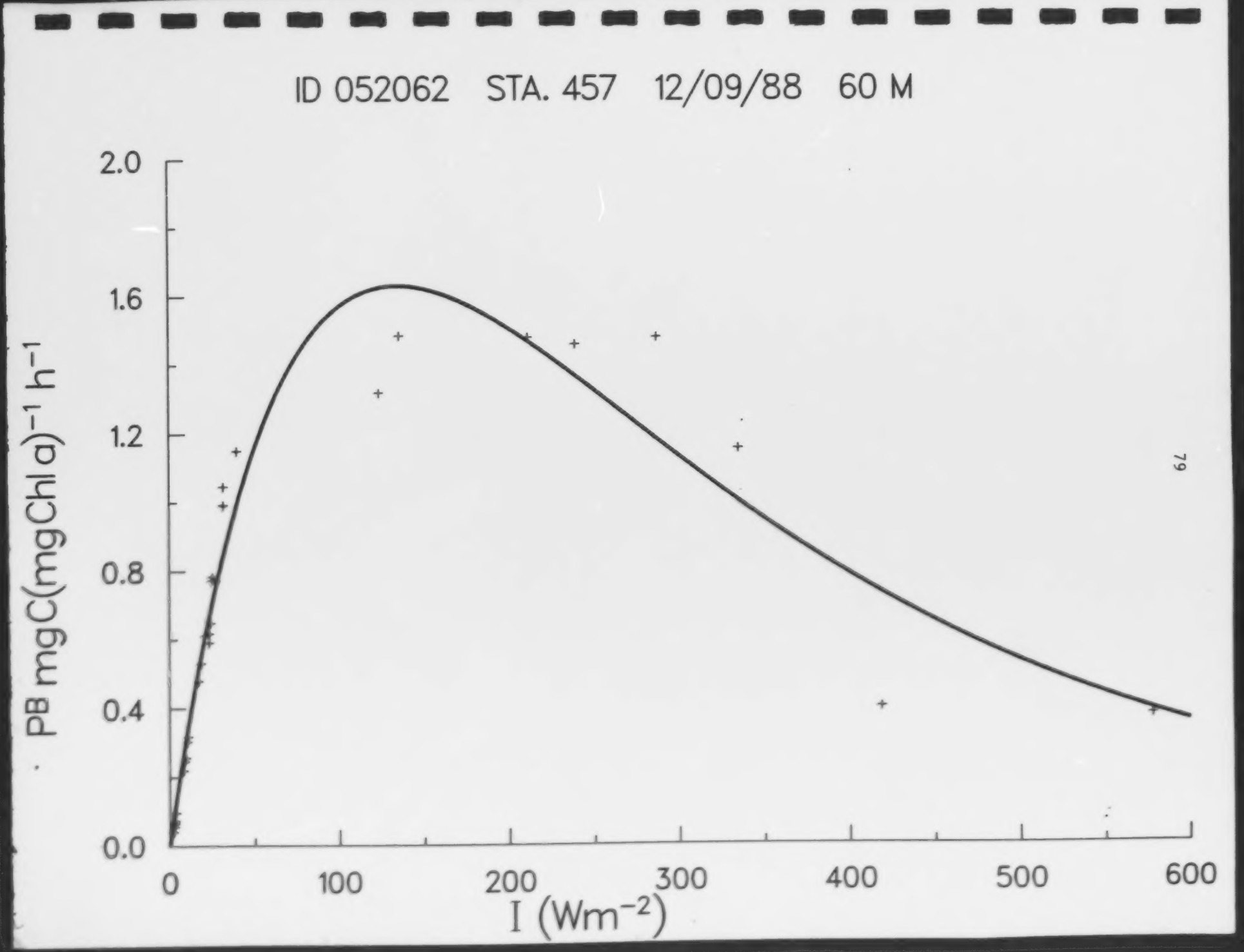

ID 051379 STA. 426 10/09/88 10 M
5.5
4.4
3.3
2.2
1.1
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})

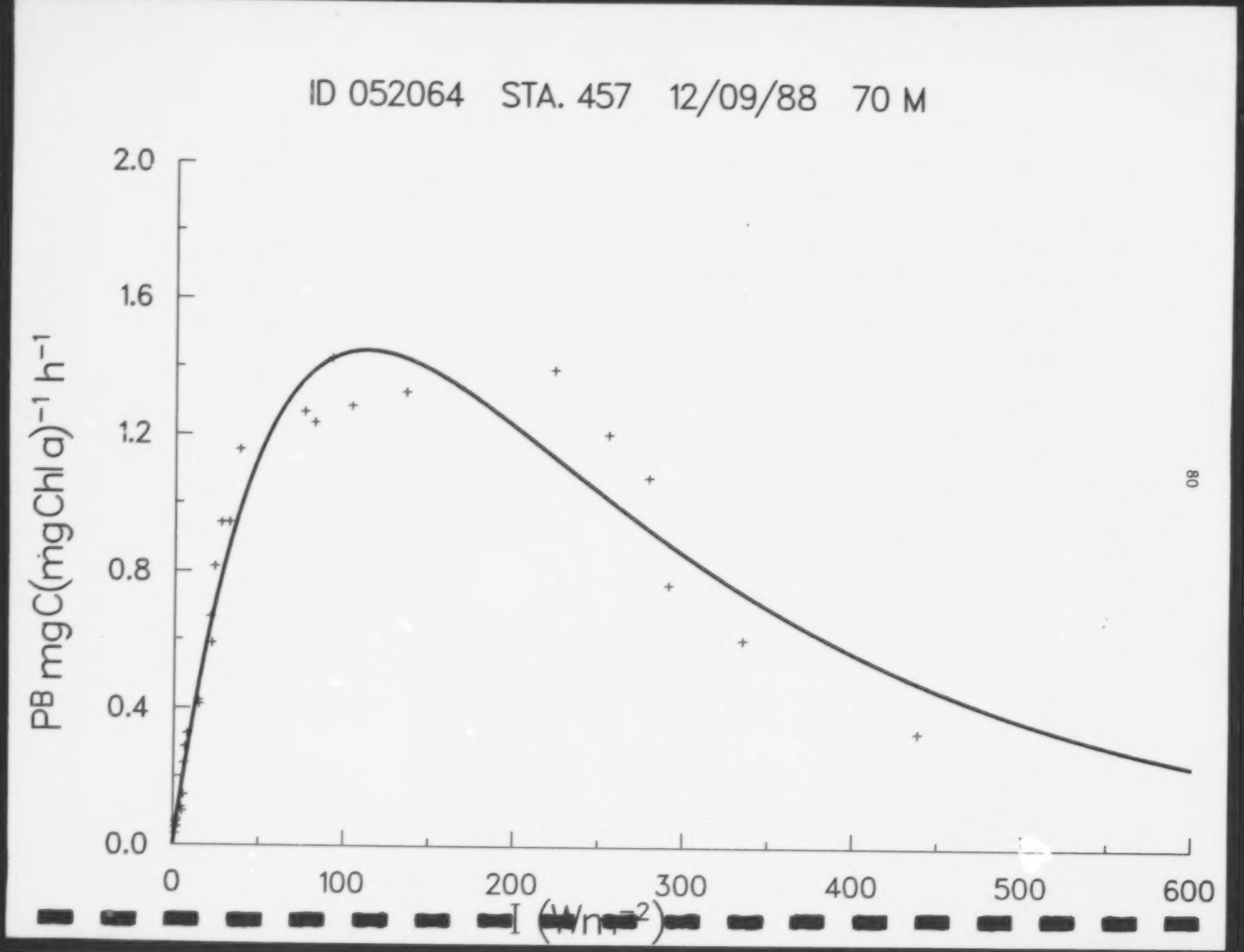

ID 051380 STA. 426 10/09/88 20 M
PB mgC(mgChl a)$^{-1}$ h^{-1}
5.0
4.0
3.0
2.0
1.0
0.0
0
100
200
300
400
500
600
I (Wm^{-2})

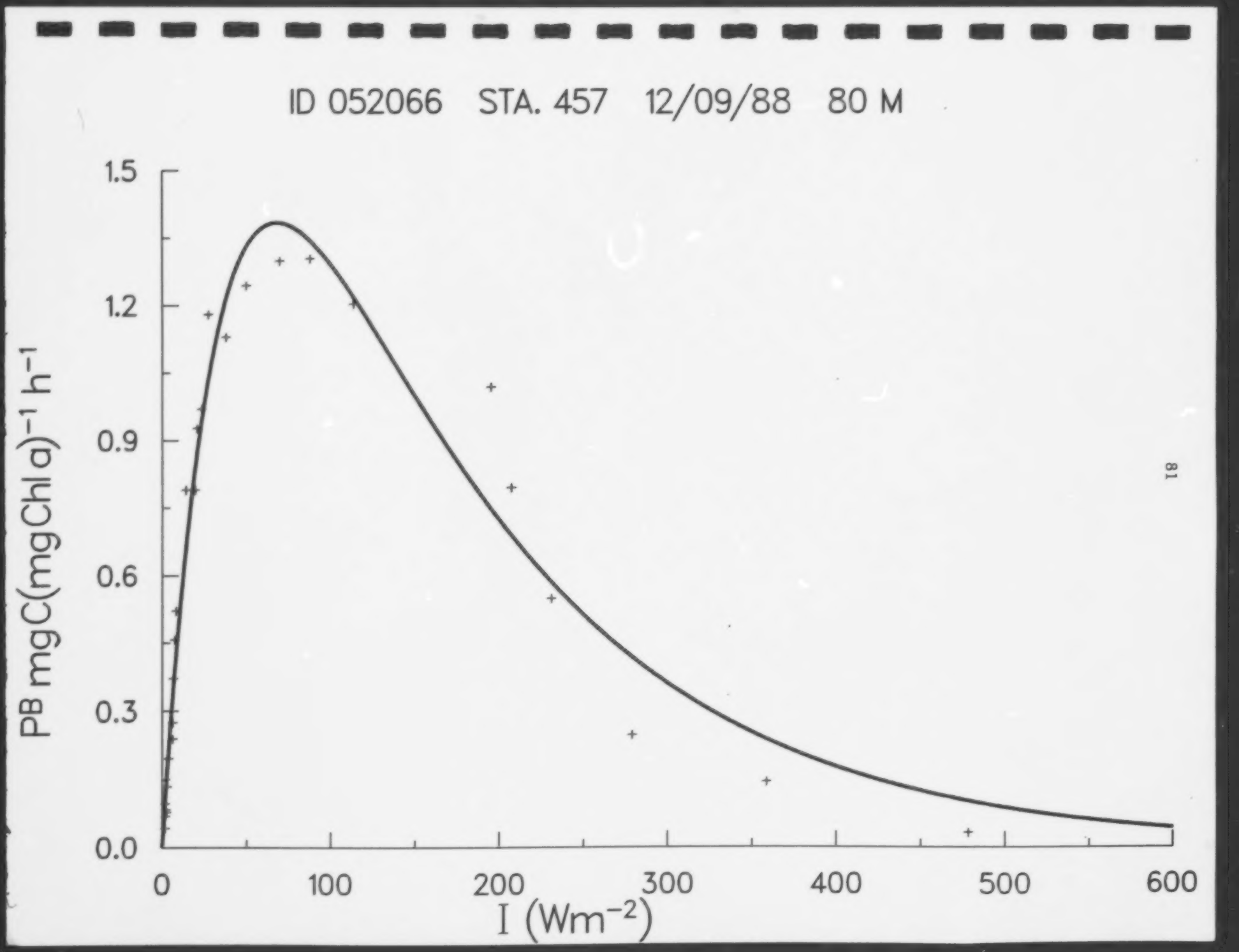

ID 052020 STA. 440 11/09/88 30 M
4.0
3.2
2.4
1.6
0.8
0.0
PB mgC(mgChl a)⁻¹ h⁻¹
0
100
200
300
400
500
600
I (Wm⁻²)

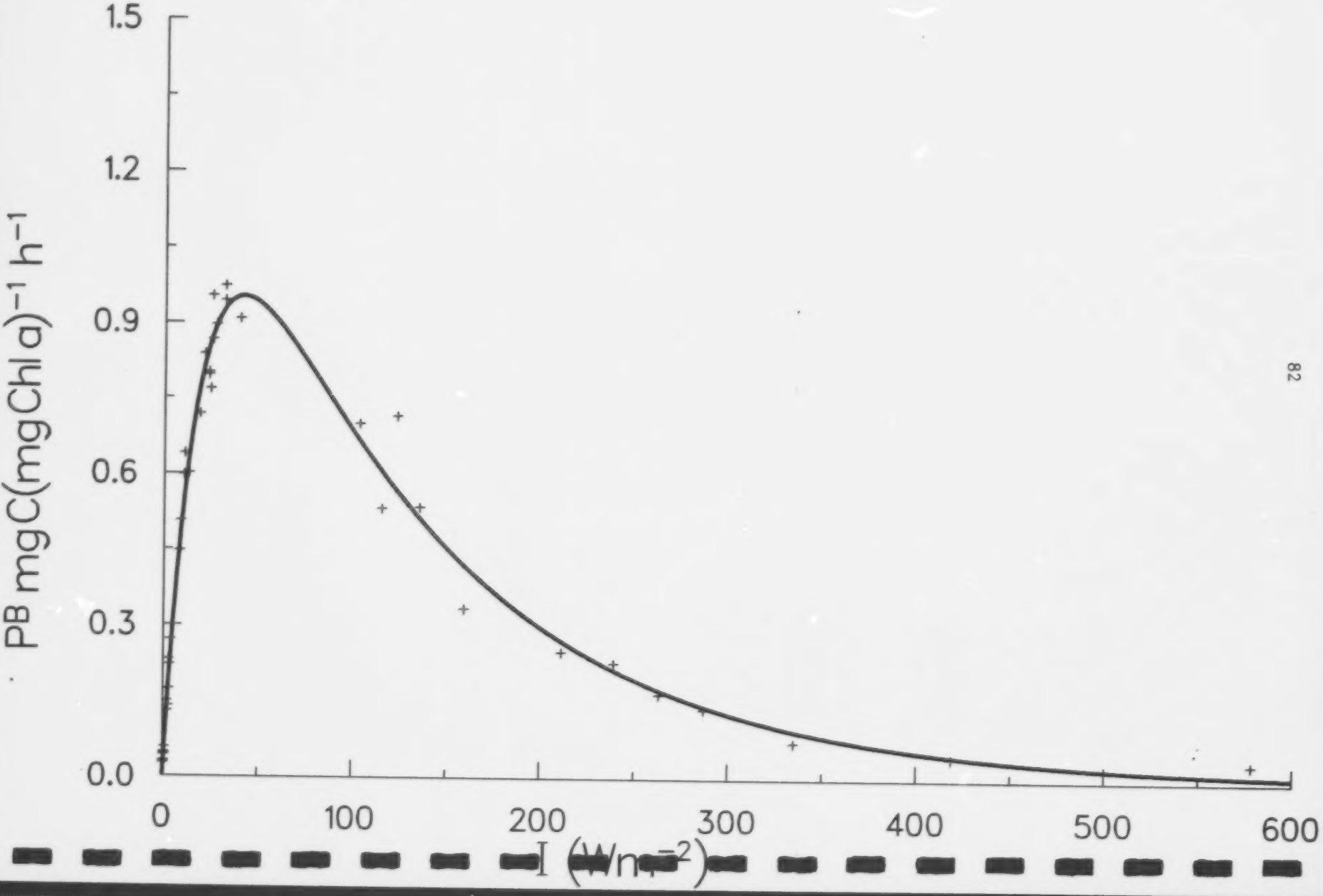

ID 052022 STA. 440 11/09/88 40 M
3.5
2.8
2.1
1.4
0.7
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
77

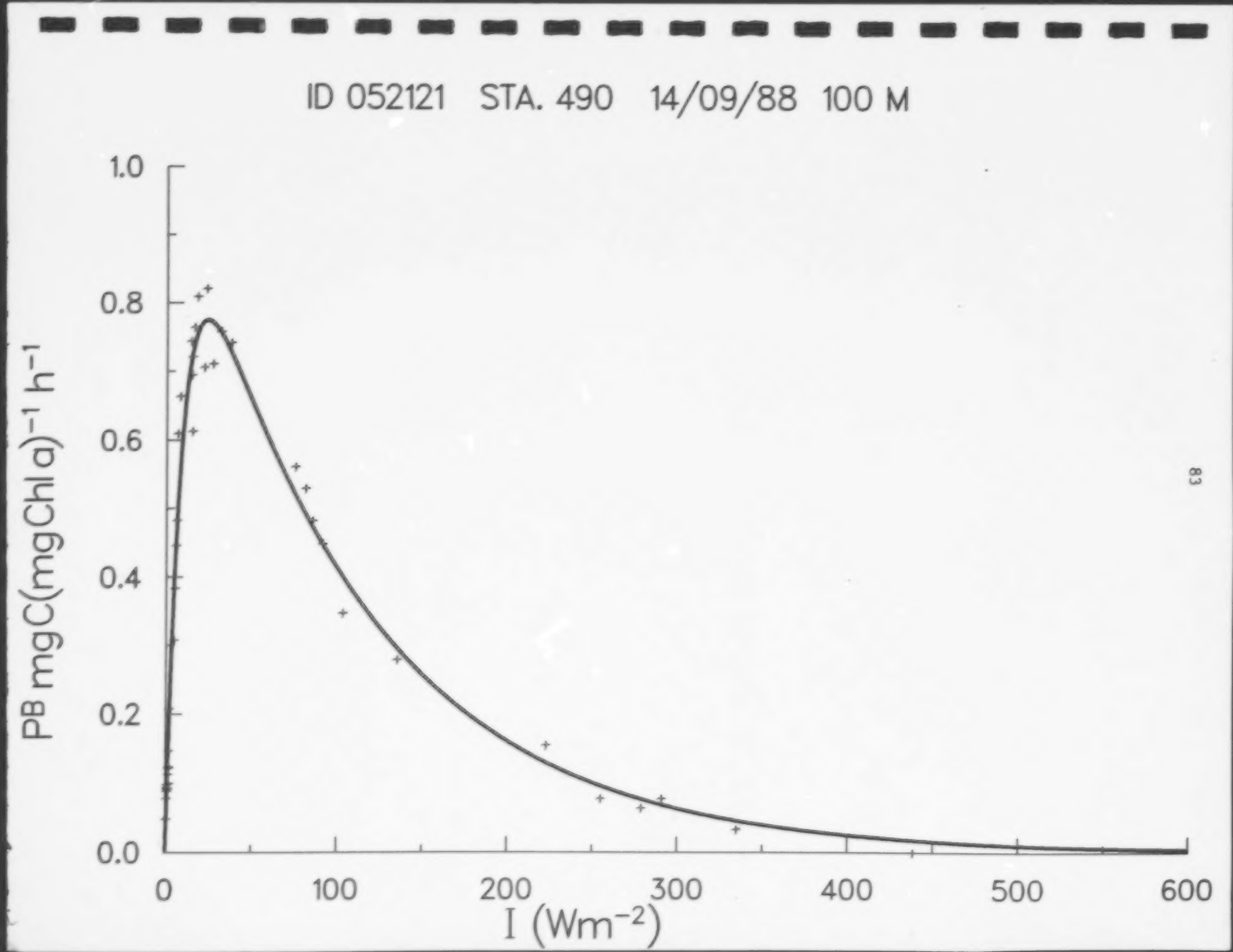

ID 052024 STA. 440 11/09/88 50 M
3.0
2.4
1.8
1.2
0.6
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
78

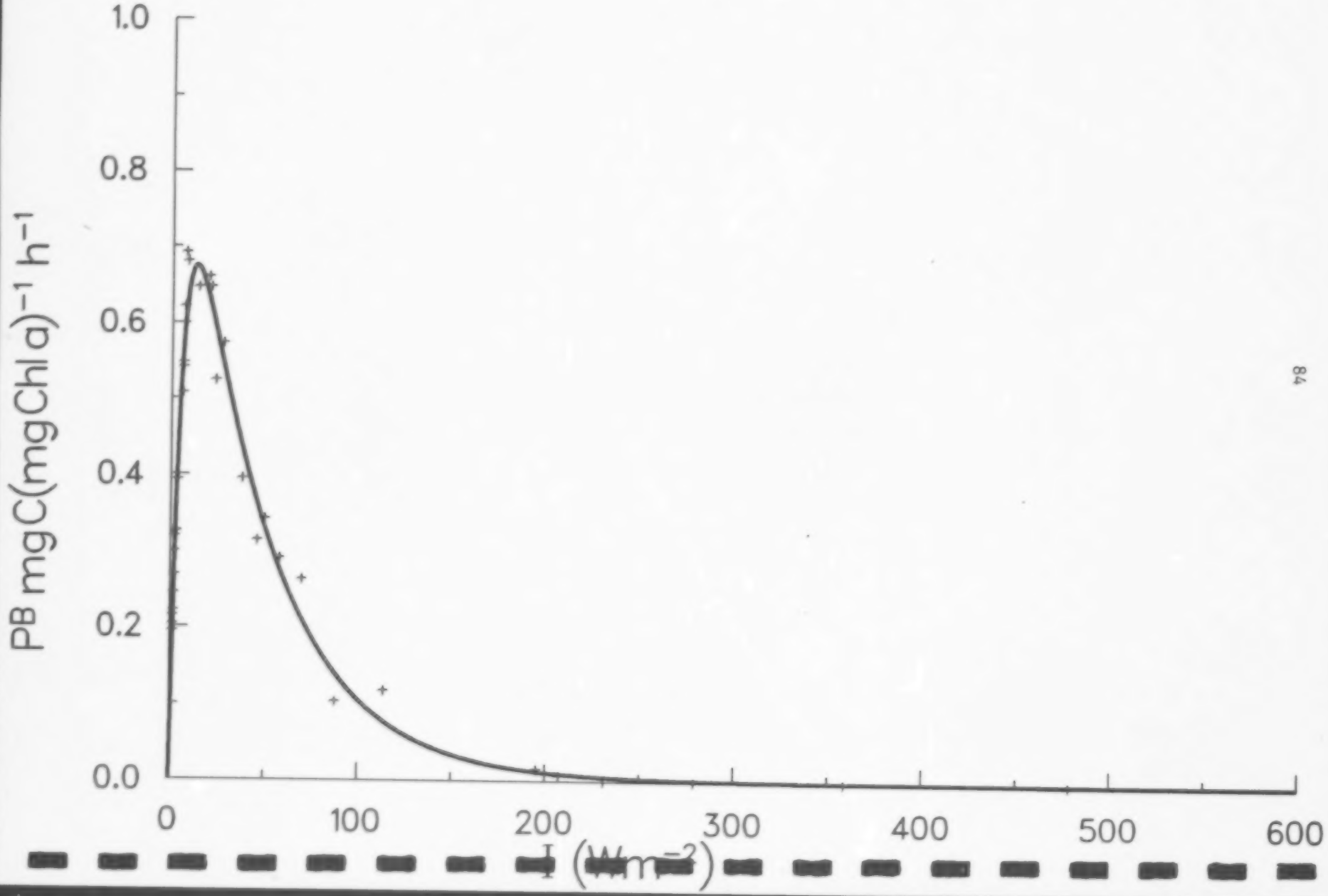

ID 052062 STA. 457 12/09/88 60 M
2.0
1.6
1.2
0.8
0.4
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
79

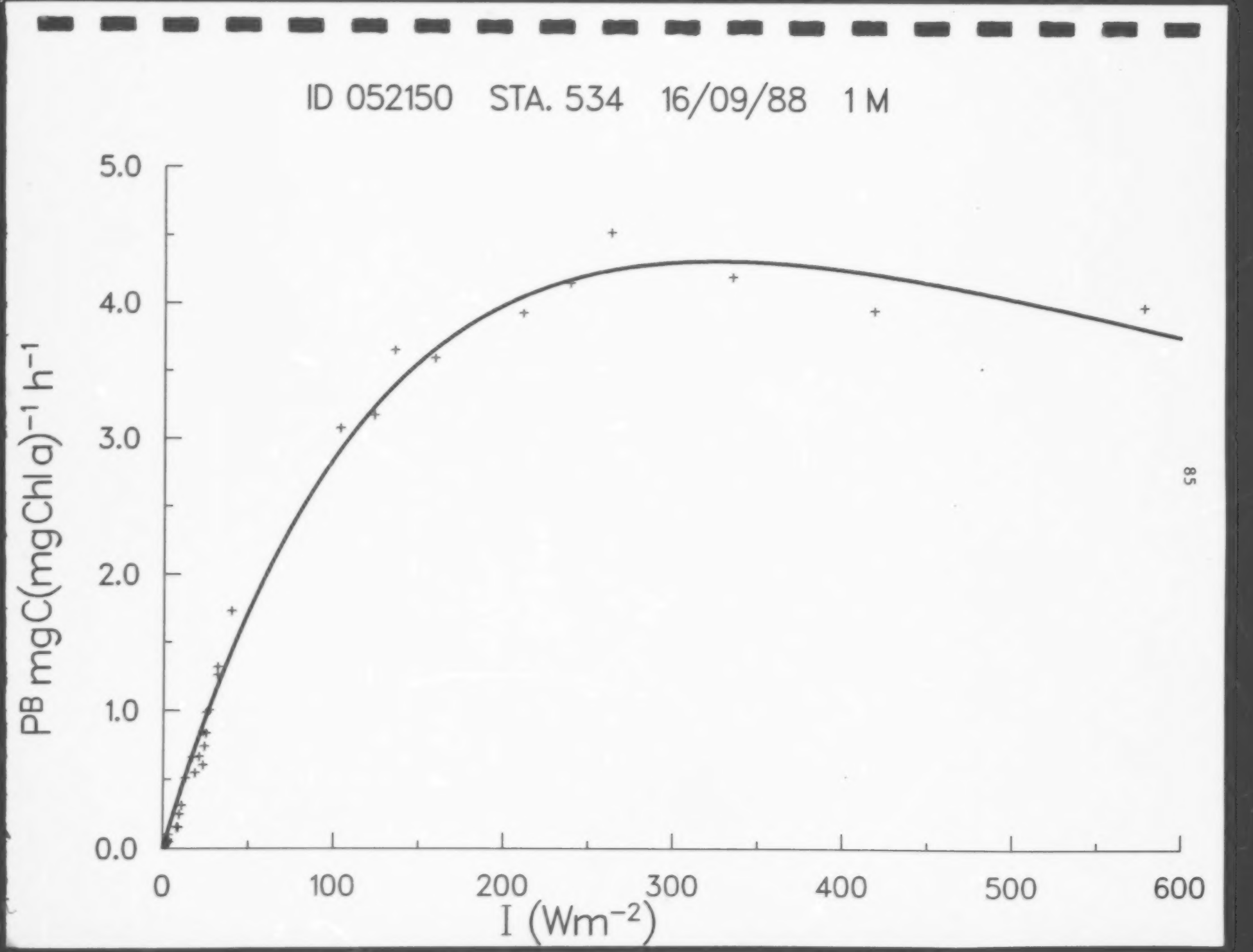

ID 052064 STA. 457 12/09/88 70 M
2.0
1.6
1.2
0.8
0.4
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (W m^{-2})
80

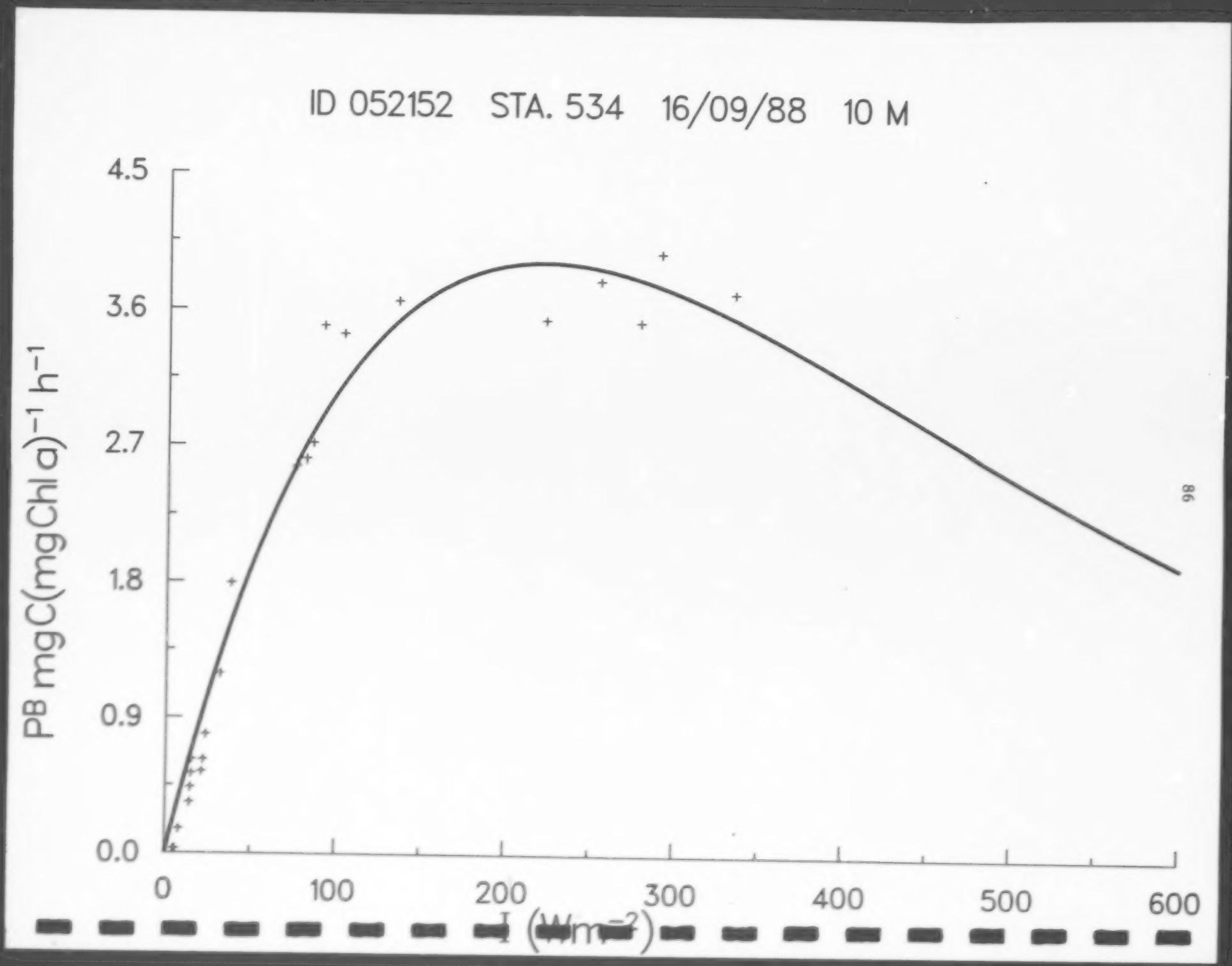

ID 052066 STA. 457 12/09/88 80 M
1.5
1.2
0.9
0.6
0.3
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
81

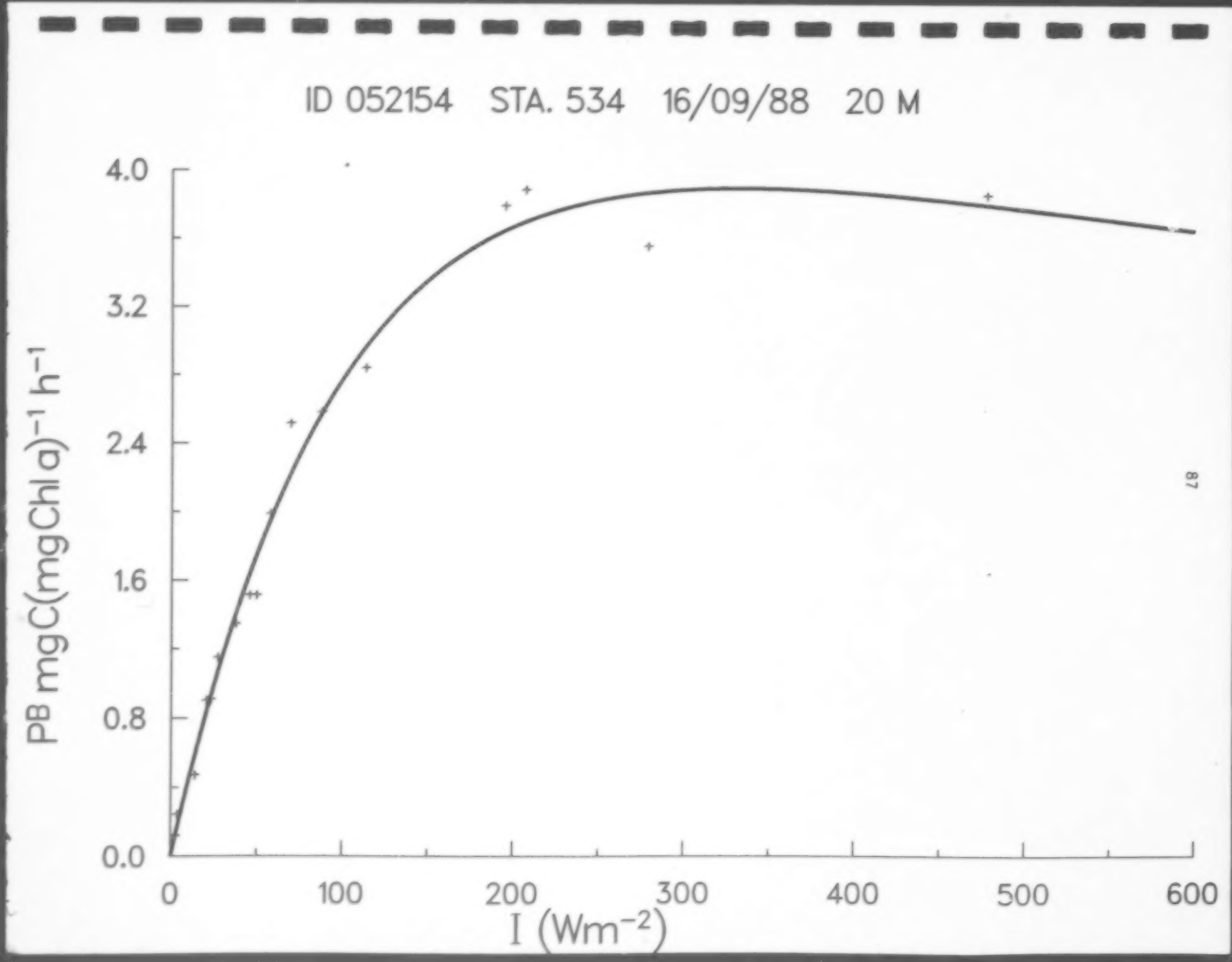

ID 052119 STA. 490 14/09/88 90 M
1.5
1.2
0.9
0.6
0.3
0.0
PB mgC(mgChl a)⁻¹ h⁻¹
0
100
200
300
400
500
600
I (Wm⁻²)
82

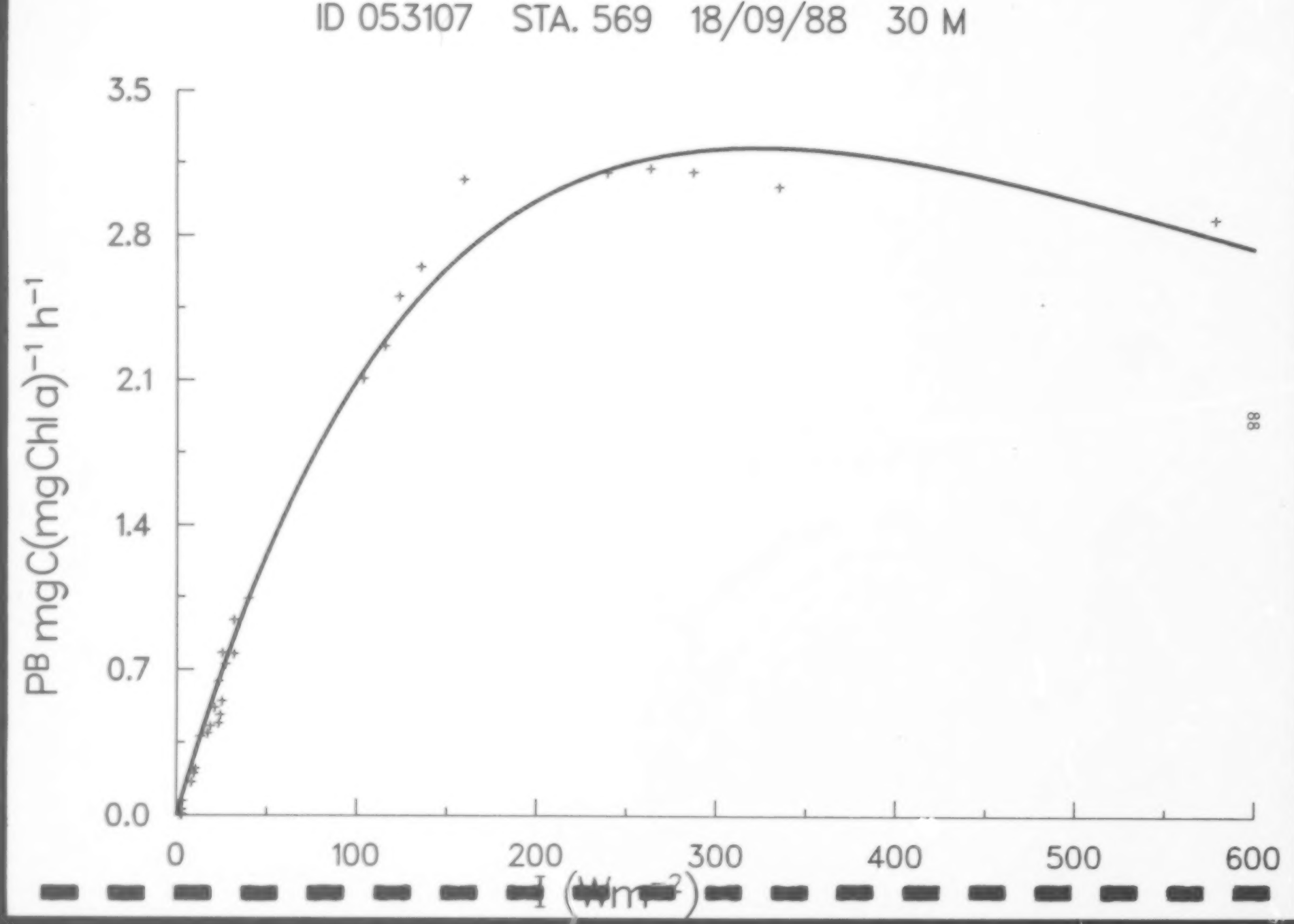

ID 052121 STA. 490 14/09/88 100 M
PB mgC(mgChl a)$^{-1}$ h^{-1}
1.0
0.8
0.6
0.4
0.2
0.0
0
100
200
300
400
500
600
I (Wm^{-2})
83

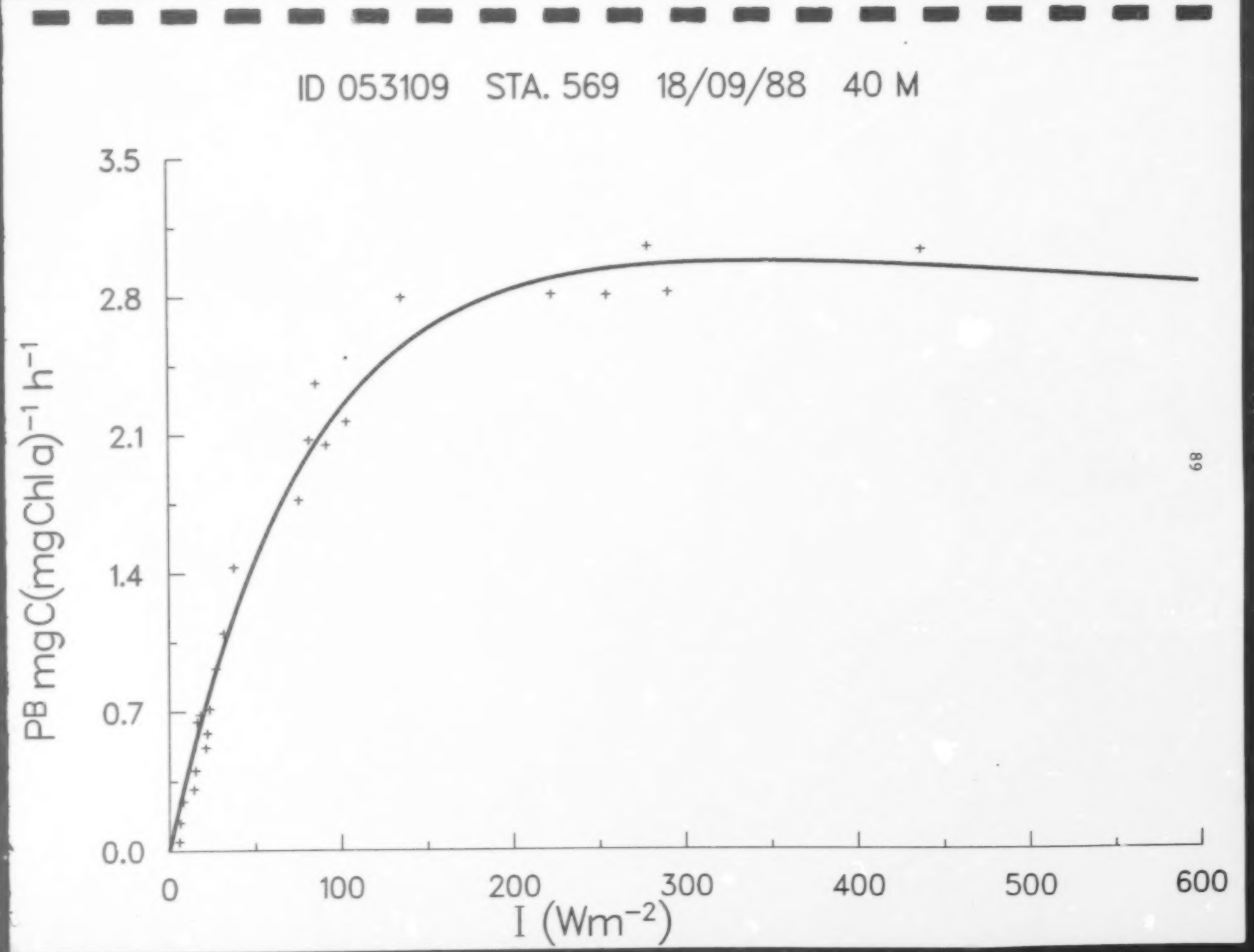

ID 052123 STA. 490 14/09/88 110 M
1.0
0.8
0.6
0.4
0.2
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
84

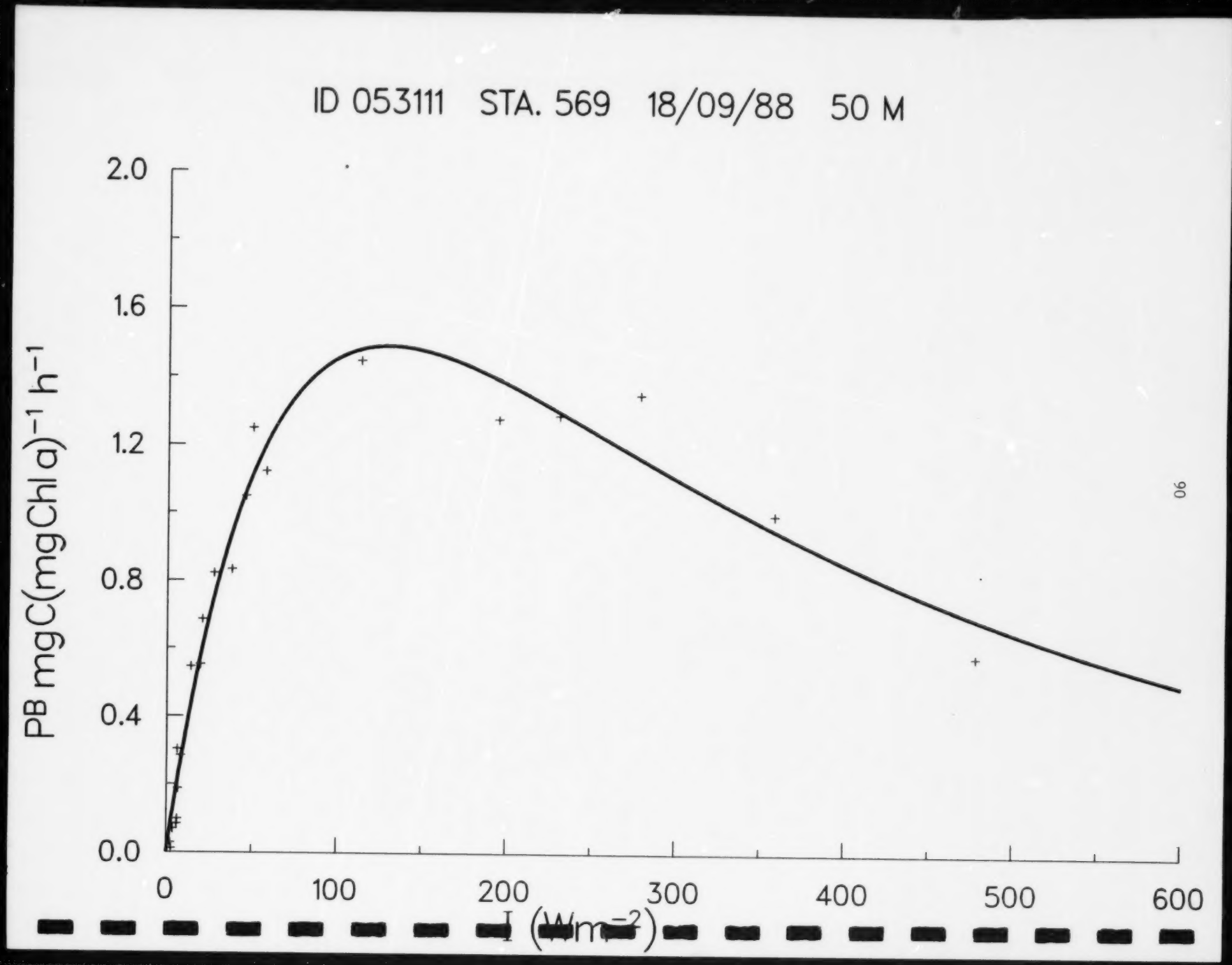

ID 052150 STA. 534 16/09/88 1 M
PB mgC(mgChl a)$^{-1}$ h^{-1}
5.0
4.0
3.0
2.0
1.0
0.0
0
100
200
300
400
500
600
I (Wm^{-2})
85

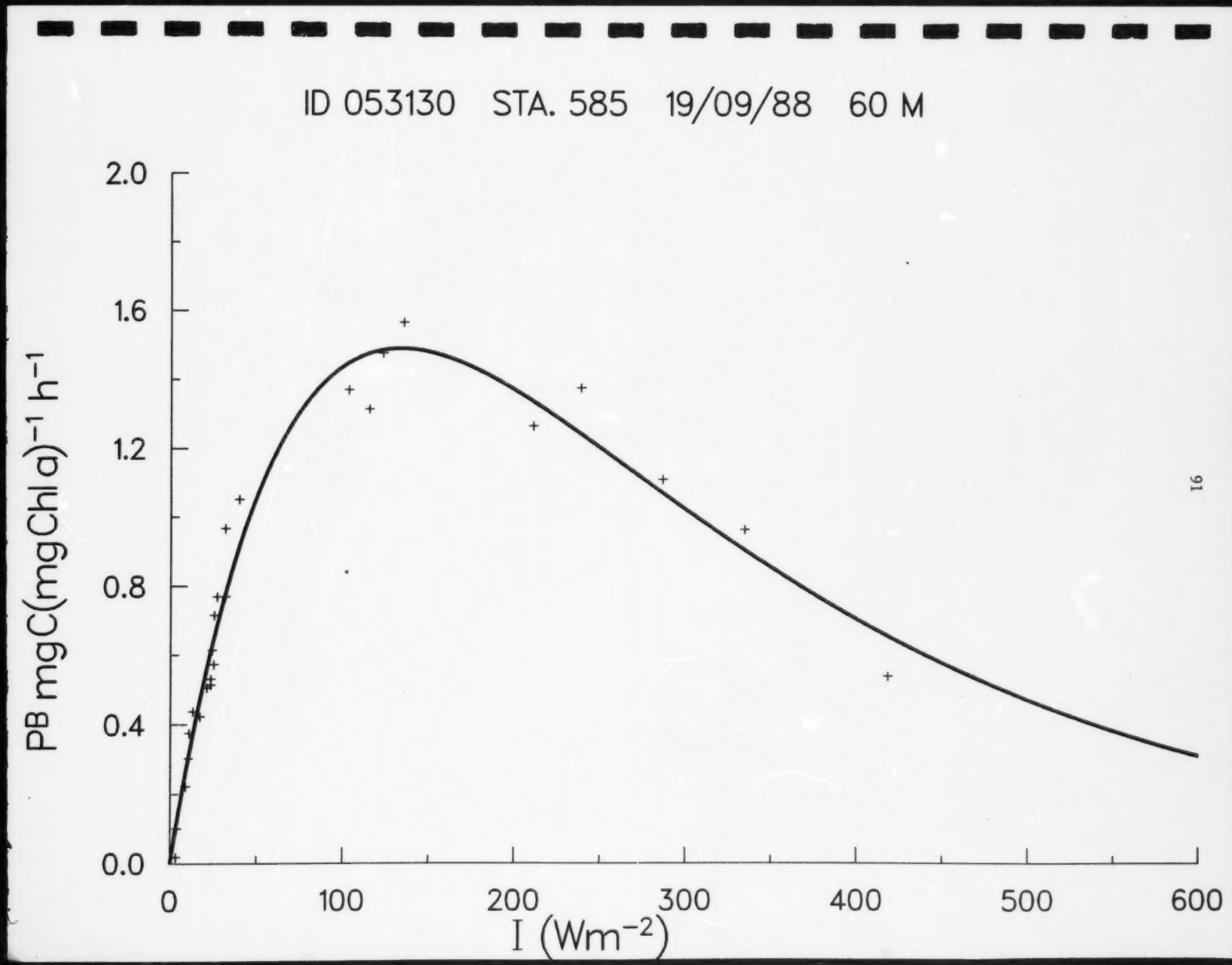

ID 052152 STA. 534 16/09/88 10 M
4.5
3.6
2.7
1.8
0.9
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
98

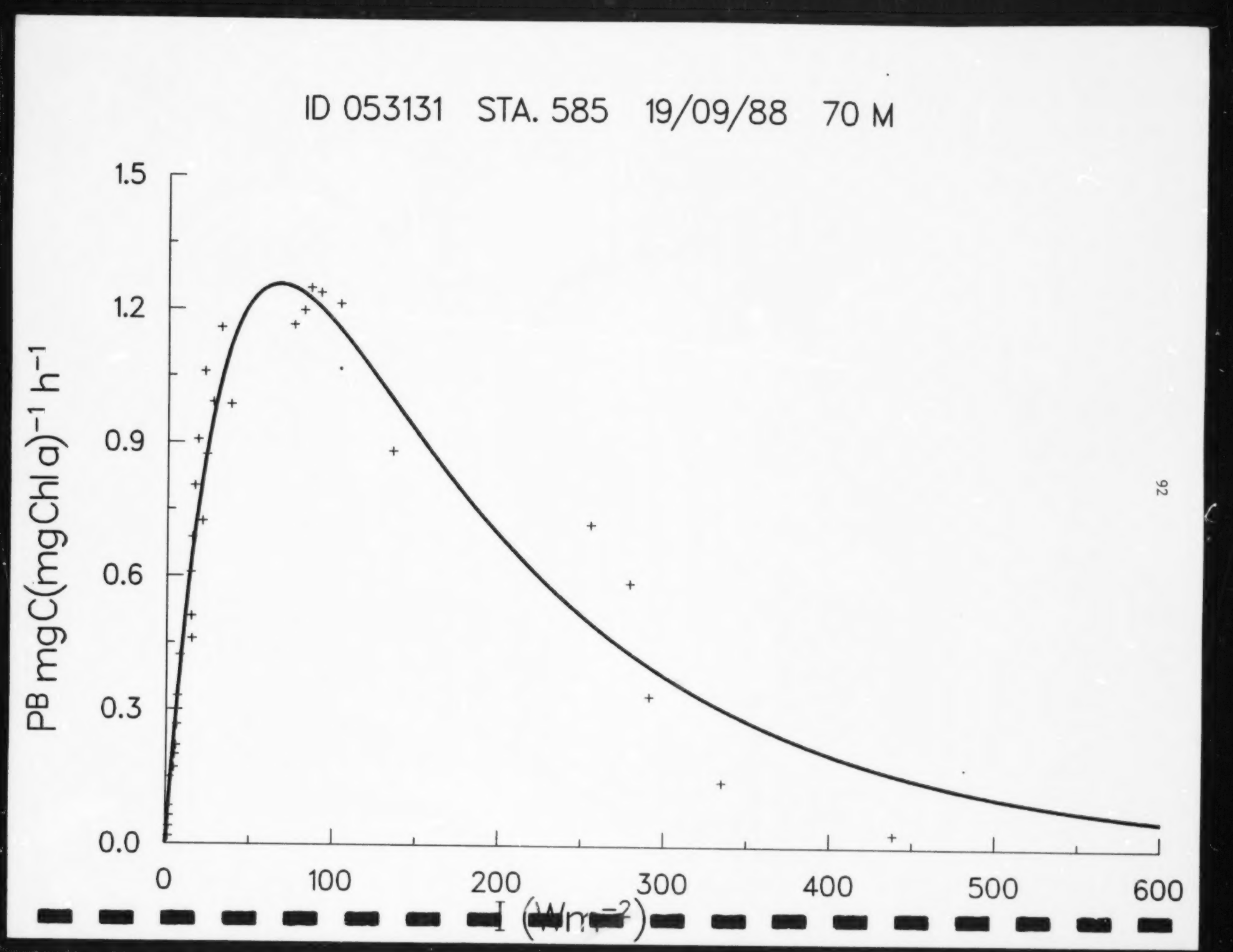

ID 052154 STA. 534 16/09/88 20 M
4.0
3.2
2.4
1.6
0.8
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
87

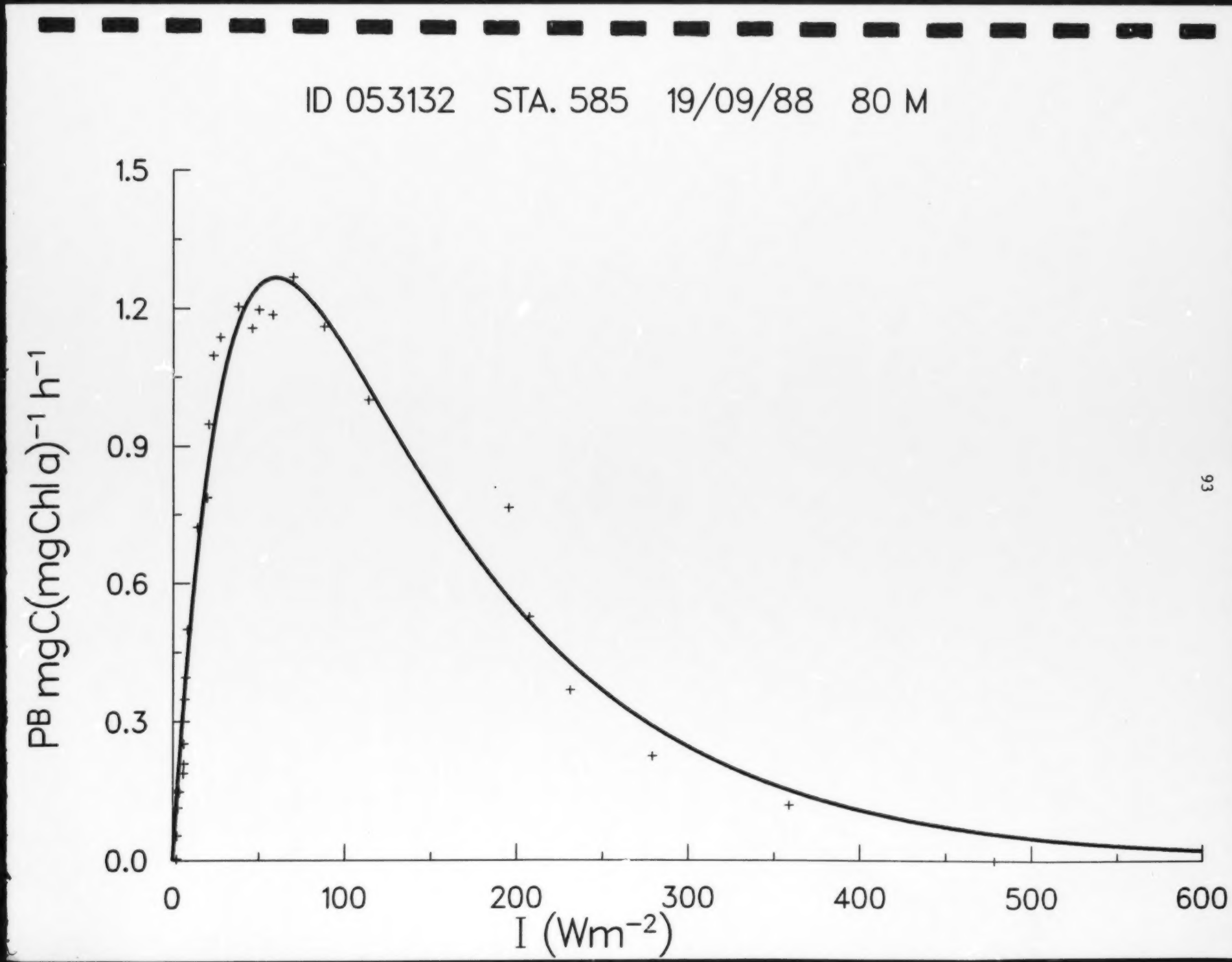

ID 053107 STA. 569 18/09/88 30 M
3.5
2.8
2.1
1.4
0.7
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
88


ID 053109 STA. 569 18/09/88 40 M
3.5
2.8
2.1
1.4
0.7
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
68


ID 053111 STA. 569 18/09/88 50 M
2.0
1.6
1.2
0.8
0.4
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
06


ID 053130 STA. 585 19/09/88 60 M
PB mgC(mgChl a)$^{-1}$ h^{-1}
2.0
1.6
1.2
0.8
0.4
0.0
0
100
200
300
400
500
600
I (Wm^{-2})


ID 053131 STA. 585 19/09/88 70 M
PB mgC(mgChl a)$^{-1}$ h^{-1}
1.5
1.2
0.9
0.6
0.3
0.0
0
100
200
300
400
500
600
I (Wm^{-2})


ID 053132 STA. 585 19/09/88 80 M
PB mgC(mgChl a)$^{-1}$ h^{-1}
1.5
1.2
0.9
0.6
0.3
0.0
0
100
200
300
400
500
600
I (Wm^{-2})
93